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## EDITOR'S INTRODUCTION

We are grateful for the warm reception and enthusiasm that accompanied the distribution of the first issue of the Wagner College Forum for Undergraduate Research. The many comments received were most encouraging. It is our hope that the journal will motivate an increasing number of students and help perpetuate a scholarly atmosphere on campus.

For those who did not get a chance to read the Fall 2002 issue, the Wagner Forum for Undergraduate Research is an interdisciplinary journal which provides an arena where students can publish their research. Papers are reviewed with respect to their intellectual merit and scope of contribution to a given field. To enhance readability the journal has been subdivided into three sections entitled the Natural Sciences, the Social Sciences and Critical Essays respectively. The first two sections are limited to papers and abstracts dealing with scientific investigations (experimental and theoretical). The third section is reserved for speculative papers based on the scholarly review and critical examination of previous works.

This issue begins with a fascinating study of Fetal Alcohol Syndrome using zebrafish. It continues with an investigation into how and why pornography is detrimental to sexual relationships. An excellent article on the issues of class and gentility as depicted by Chaucer later awaits the curious reader as does an interesting perspective on the irrational prejudice of homophobia. Note that these and other papers would not have been possible without the hard work and dedication of a first-rate faculty and excellent student body.

*Gregory Falabella and Richard Brower, Editors*



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# **Section I: The Natural Sciences**





# **Alcohol-Induced Malformations in Zebrafish Embryos: Zebrafish as a Model Animal to Study Fetal Alcohol Syndrome<sup>1</sup>**

Jacqueline Whittenburg, Renée Sudol, Linda Raths and Zoltan Fulop  
Presented at the 56<sup>th</sup> Eastern Colleges Science Conference in Niagara, NY<sup>2</sup>

The goal of this study was to determine the lowest ethyl alcohol (ETOH) concentration that causes detectable detrimental effects in zebrafish embryos, and the most critical time of embryonic development that is sensitive to alcohol. Observation of these embryos revealed a number of different morphological changes. These were either teratological effects, such as small heads with distorted craniofacial features, curved spine and distended abdomens or physiological disturbances such as impaired movements, inability to maintain postures and inability to capture prey. This study establishes zebrafish as a model animal to study fetal alcohol syndrome.

## **I. Introduction**

Studies suggest that alcohol use in the United States in any year may yield costs that represent 2-5% of the gross domestic product, which is almost equivalent to half of what the country spends on health care (Godfrey, 1997). Alcohol is an addictive substance. Alcohol addiction means one's loss of control of substance ingestion despite knowledge of associated problems (Varcarolis, 2001). Consumption of alcohol is positively correlated with the risk of detrimental personal health and social behavior (Sjoberg, 1998). Although alcohol-related problems are a significant source of morbidity and mortality in the United States, denial and resistance to treatment by affected individuals and their families make detection and treatment of alcoholism challenging (Martin *et al.*, 1999). The National Institute on Drug Abuse and Alcoholism estimates

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<sup>1</sup> The manuscript is included here for the purpose of displaying Wagner College undergraduate research, not as an official publication. It is being submitted to an archival journal for publication consideration.

<sup>2</sup> This research was also presented at Wagner College as an Honor's Thesis.

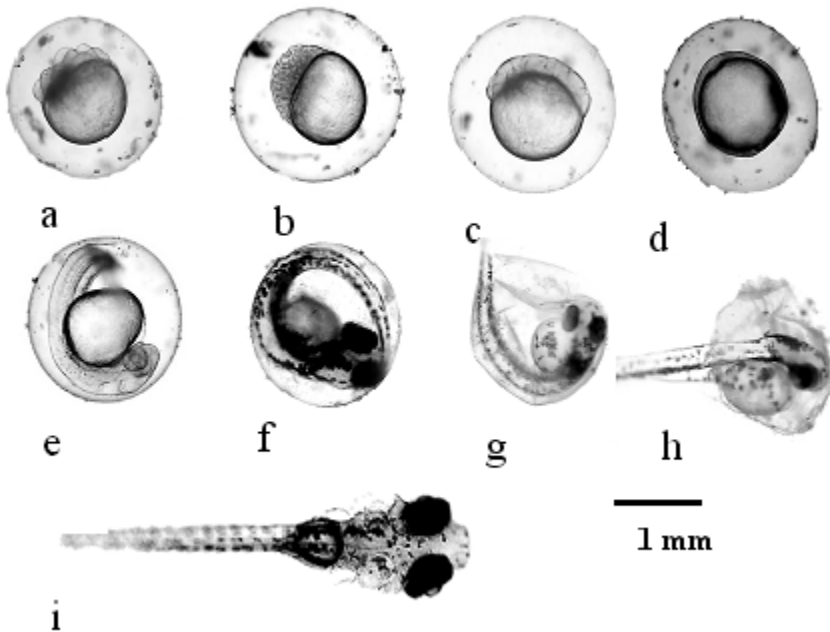
that 7.62 million babies were exposed to alcohol during gestation. Many of them were born with a constellation of physical, behavioral, and cognitive abnormalities collectively referred to as fetal alcohol syndrome (FAS) (Young, 1997). These children, who would require the utmost care, are, unfortunately, experiencing serious deficits in care provided by an alcoholic mother and/or immediate family members. Many of them grow up with different mental and physical disabilities requiring extensive care, and often they lead unproductive lives. Among the many problems associated with excessive alcohol consumption, FAS is one of the most emotive, especially because it is preventable (Jacobs, 2000).

One of the most notable features of FAS is alteration in the face and the small size of the head (microcephaly), as well as retarded behavior due to a reduced size of the brain. These features affect approximately 80% of children afflicted with FAS (Jacobs, 2000). Newborns with the syndrome show irritability, hypotonia and tremors; many show signs of withdrawal effects. Sensory deficits associated with FAS include optic nerve hypoplasia (reduced number of neuronal fibers in the optic nerve), poor visual acuity and hearing loss, as well as receptive and expressive language delays (Lewis and Woods, 1994).

The extensive use and abuse of alcohol in our society clearly necessitates innovative ways to integrate initial prevention, treatment, and relapse prevention efforts (Wellisch *et al.*, 1997). One of the best possible ways to address these problems could be education to the public at large, based on accurate scientific findings. Although a lot is known about the many faceted effects of alcohol on developing fetuses, further research is warranted to understand specific cause and effect correlations, especially in the field of the central nervous system (CNS). For apparent ethical reasons, human subjects cannot be used for experimentation. The available human data were collected through observation of affected individuals. However, animal studies allow one to perform controlled experiments, exploring variables such as the amount and concentration of alcohol used, pattern of consumption, and timing of alcohol exposure during pregnancy (Becker *et al.*, 1994). Studies conducted to determine the critical time for the effects of alcohol exposure have found that there may be more than one critical period of exposure, and the adverse effects of alcohol during development may be cumulative (Cronise *et al.*, 2001). As seen in humans, animal models have also demonstrated a wide variety of organ anomalies after both acute and chronic exposure to alcohol (Becker, et al, 1994). In these types of studies mostly laboratory rats or mice were used when the pregnant female was maintained on water containing alcohol. However, due to the difficulty of studying rat fetuses, alcohol effects were mainly studied in newborn or postnatally developing offspring (Nwaogu and Ihemelandu, 1999). This type of research gives little or no

insight into the immediate effects of alcohol on early embryos when CNS development shows its most significant changes (Costa and Guizzetti, 1999).

A good opportunity to study the early stages of FAS evolved when zebrafish (*Danio rerio*) became a widely used laboratory animal and a vertebrate model in developmental brain research. The zebrafish is an ideal animal model for research of development and diseases for many reasons (Gerlai et al., 2000). It is a small, hardy fish with a relatively short generation time, and its embryo develops in a transparent chorion (Figure 1). This latest feature allows the embryo to be easily observed under a light microscope without harming the embryo or disturbing its development (Brown, 1997). Accordingly, research that aims to determine the threshold dose of alcohol that has specific effects on early embryonic brain development, has a greater chance to succeed if zebrafish embryos are used instead of rats (Becker *et al.*, 1994).



**Figure 1.** Microphotographs of zebrafish embryos and larvae at different times of their development. Pictures (a-f) show different consecutive stages of the developing embryos during the first three days. Pictures (g) and (h) show two consecutive steps of hatching around day 4. Picture (i) shows a young larva at day 10.

The goal of this study was to establish the zebrafish as an animal model for studying FAS. First, we aimed to establish the concentration of alcohol in which embryos could survive while developing morphologically and behaviorally detectable defects. The second goal was to find the most critical period of development sensitive to alcohol exposure. These questions were investigated in two interrelated but separate experiments.

## **II. Materials and Methods**

Sexually mature zebrafish of both sexes were maintained in a light controlled colony room with a 10h: 14h dark: light cycle. Water quality was assured with an intensive filtering system and the water temperature was kept at 28.5 °C. The fish eggs were obtained using a specifically designed breeding-box (S.C. Howie, personal communication) in which six adult male and six adult female fish were placed together overnight. The eggs were collected the next morning, one hour after the daylight cycle started. All the healthy eggs were cleaned of debris and randomly selected into groups of twelve.

### Experiment 1

The goal of this experiment was to find that low ethyl alcohol (ETOH) concentration(s) which can induce visible morphological effects on zebrafish embryos/larvae during their early development (first 14 days). The following ETOH concentrations were selected for testing: 0.05%, 0.08%, 0.10% and 0.50%. (Note that these concentrations are close to the legal blood alcohol level for humans allowed to operate motor vehicles (0.08%).

Seventy-two zebrafish eggs/embryos were used in this experiment. The eggs were randomly selected into six groups (n=12). Two groups were used as control and one group was used for each selected ETOH concentrations. Control animals were kept in 100 ml pure egg-water solution [60 µg/ml Instant Ocean Salt (Aquarium Systems Inc.) in distilled water]. Experimental animals were kept in 100 ml egg-water solution containing the appropriate ETOH concentrations. Eggs were kept for 14 days in 250 ml beakers at room temperature (≈25 °C). The beakers were covered with watch glasses to prevent evaporation. The solution was changed once every day.

Embryos were inspected daily under an Olympus (BX40) microscope at magnification 4X, at a regular time of day, when the alcohol-water was changed. The number of surviving embryos was recorded. Surviving embryos were also observed for any visible anomalies. The most characteristically deformed embryos were photographed at magnification 4X, using a computer-assisted Sony *ExwaveHAD* digital color video camera and *FlashBus* version 1.2 software (Integral Technologies, Inc., Indianapolis,

Indiana). Dead embryos were removed and fixed in a Karnowsky's solution (4% paraformaldehyde and 2.5% glutaraldehyde, pH= 7.2) at room temperature for 2h, washed three times in 0.1 M phosphate buffer solution, and transferred to 70% ETOH for further histological examination. At the end of the experiment (day 14) any surviving embryos were cooled to 4 °C, fixed and processed as described above.

### Experiment 2

The goal of this experiment was to find the most critical period of developmental sensitivity to alcohol exposure. One hundred forty-four zebrafish eggs/embryos were used in this experiment. Two groups of eggs were maintained in pure egg-water solution throughout the experiment and used as controls. Starting with day two, every second day (days 2, 4, 6, 8 and 12), a group of eggs (n=12) was placed into a 0.05% and a 0.08% concentration of ETOH solution and kept until they reached 14 days of development. (The first experiment revealed that alcohol concentrations of 0.05% and 0.08% were the lowest ETOH concentrations that induced morphological, detectable changes with lesser mortality. Hence, these concentrations were selected for this experiment). Animals were kept in 100 ml of egg-water or 100 ml of corresponding alcohol solution as defined earlier. Eggs were kept for 14 days in 250 ml beakers at room temperature. The beakers were covered with watch glasses to prevent evaporation. The solution was changed once every day.

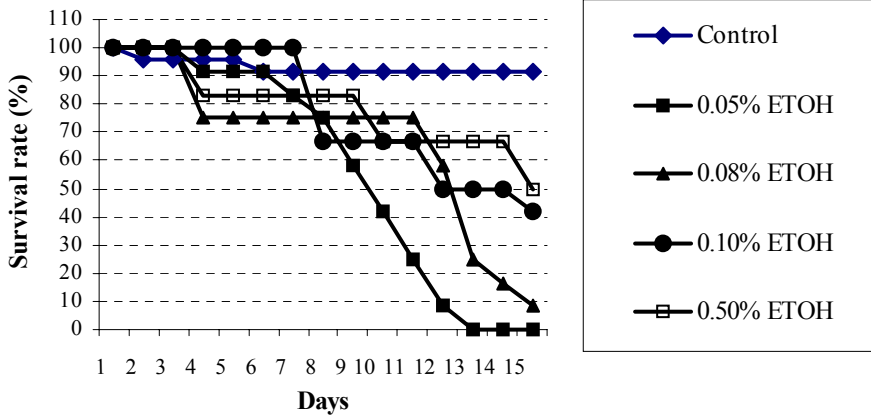
As in the first experiment, embryos were inspected daily under an Olympus (BX40) microscope at magnification 4X, at a regular time of the day, when the alcohol-water was changed. The number of surviving embryos was recorded. Surviving embryos were also observed for any visible anomalies and photographed as described earlier.

### Statistical Analysis

Survivals to day 14 between treatments and controls were analyzed using Fisher's Exact Test. Because multiple comparisons were made, alpha levels were adjusted using Bonferroni's Method to control the experiment-wide Type I error rate. With four comparisons (each treatment versus control) the adjusted alpha level was  $0.05/4= 0.0125$ .

### III. Results

#### Experiment1



**Figure 2.** Figure 2 shows graphic presentation of survival rate of zebrafish embryos continuously exposed to four different alcohol (ETOH) concentrations, namely 0.05%, 0.08%, 0.10% and 0.50%, during the first 14 days of their development. Significant differences were found between the effects of the four alcohol concentrations as compared to the control ( $p=0.0025$ ,  $p=0.0091$ ,  $p=7.3 \cdot 10^{-8}$  and  $p=1.4 \cdot 10^{-6}$  in 0.05%, 0.08%, 0.10% and 0.50% ETOH, respectively). In all ETOH concentrations embryos started to die after the first week and most of them were dead by the end of the experiment (day 14).

The morphological analysis of the surviving embryos as compared to their control counterparts showed drastic effects on embryos in all ETOH solutions, even when embryos were kept in the lowest ETOH concentration (0.05%). Some embryos developed detectable spinal deformities (Figure 3), described as spinal curvature close to either the head or the tail.

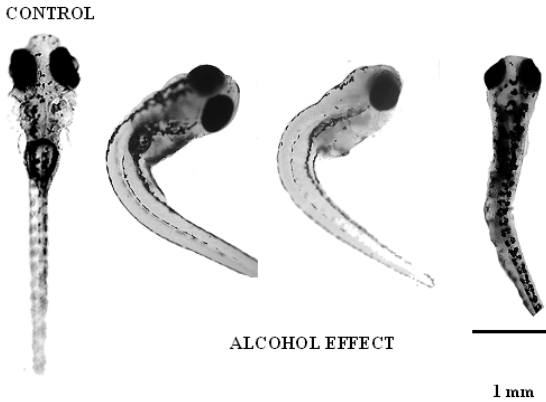


Figure 3: Picture at far left (Control) shows a 14-day-old control zebrafish larva developed in pure egg-water. Pictures at right from the control depicts 10-day-old zebrafish larvae showing signs of spinal deformities in ETOH.

These embryos also showed features of microcephaly. It should be noted that while in 0.50% ETOH these deformities appeared around the end of the first week, while in lower concentrations (0.05% and 0.08% ETOH) the appearance of this deformation was delayed until closer to the end of the second week. Embryos with such defects were unable to maintain normal posture and were frequently positioned side-up, or in more severe cases, belly-up. At the same time, these animals showed abnormally enlarged (swollen) abdomens (Figure 4).

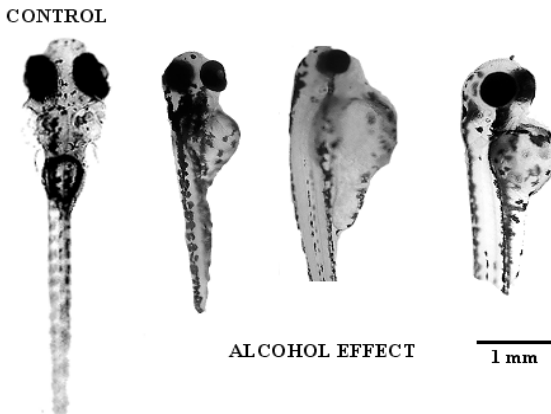


Figure 4: Picture at far left (Control) shows a 14-day-old control zebrafish larva developed in pure egg-water. Pictures at right from the control depicts 8-day-old zebrafish larvae showing signs of spinal deformities.

Each embryo with any of these types of anomalies had reduced cardiac rate and blood flow, showed delayed reactions to environmental stimuli, slow or no movement and difficulties in feeding. Each was in the process of dying.

### Experiment 2

Survival rates of embryos in two selected alcohol concentrations (0.05% and 0.08%), depending on their age when exposed to alcohol are shown in Tables 1 and 2. No significant difference between the two alcohol concentrations was found. However, it is interesting to note that the most sensitive days that caused high mortality rate over a short period of time were the later days, (days 8-12 in 0.05% ETOH and 6-12 days in 0.08% ETOH). The observed trend of mortality shows that the higher the ETOH concentration, the earlier the death occurs. By contrast, in cases of early exposure to alcohol (days 2-6) the time of death is spread out over a longer period of time. Observation of these embryos also revealed a number of different morphological changes similar to those seen in Experiment 1. These were either teratological effects, such as small heads with distorted craniofacial features, curved spine (Figure 3) and distended abdomens (Figure 4) or physiological disturbances such as impaired movements, inability to maintain postures and inability to capture prey.

### IV. Discussion

Although the zebrafish became a laboratory animal more than a decade ago, we were not able to find reports indicating the use of these animals to study FAS. This finding came to us as a surprise, since zebrafish embryos provide a very convenient model for such a study. We found that alcohol concentrations as low as 0.05% or 0.08% have detrimental effects as early as seven days post exposure and cause death of most of the embryos by the end of the second week. Alcohol at concentrations of 0.1% and 0.5% induces similar effects around the same time, but it causes more severe mortality than lower concentrations.

One of the most remarkable findings of these experiments is the striking similarity between the effects of alcohol observed on developing zebrafish embryos and those effects described for humans (Lewis and Woods, 1994). We found small head size and facial deformations in zebrafish; the literature cites microcephaly and facial deformations for humans as well (Meyer, *et al*, 1997). We observed spinal curvature and impaired ability to move; the literature cites the same effects for humans (Smith and Eckardt, 1991). Zebrafish embryos showed distended abdomens and inability to feed; the literature cites lack of appetite and anomalies in the digestive tract for humans (Lewis & Woods, 1994).



**0.05% ETOH**

Days	Control		Exposed at day 2		Exposed at day 4	
	Number of embryos survived	Survival rate (%) of embryos	Number of embryos survived	Survival rate (%) of embryos	Number of embryos survived	Survival rate (%) of embryos
1	24	100				
2	23	95.8	12	100		
3	23	91.6	9	75		
4	22	91.6	9	75	12	100
5	22	91.6	9	75	11	91.7
6	22	91.6	9	75	11	91.7
7	22	91.6	9	75	11	91.7
8	22	91.6	9	75	10	83.3
9	22	91.6	9	75	10	83.3
10	22	91.6	9	75	9	75
11	22	91.6	7	58.3	2	16.7
12	22	91.6	3	25	2	16.7
13	22	91.6	2	16.7	1	0.08
14	22	91.6	1	0.08	1	0.08
Days	Exposed at day 6		Exposed at day 8		Exposed at day 12	
	Number of embryos survived	Survival rate (%) of embryos	Number of embryos survived	Survival rate (%) of embryos	Number of embryos survived	Survival rate (%) of embryos
1						
2						
3						
4						
5						
6	12	100				
7	12	100				
8	12	100	12	100		
9	12	100	12	100		
10	12	100	11	91.7		
11	12	100	7	58.3		
12	9	75	2	16.7	12	100
13	1	0.08	0	0	12	100
14	0	0	0	0	6	50

**Table 1.** Survival rate of zebrafish embryos in 0.05% ETOH when continuous exposure started at different times of their development; day 2 (a), day 4 (b), day 6 (c), day 8 (d) and day 12 (e). Control animals were maintained in pure egg-water solution. Survival rate is expressed as a percentage of the starting total number (12) of the embryos in each group.

**0.08% ETOH**

Days	Control		Exposed at day 2		Exposed at day 4	
	Number of embryos survived	Survival rate (%) of embryos	Number of embryos survived	Survival rate (%) of embryos	Number of embryos survived	Survival rate (%) of embryos
1	24	100				
2	23	95.8	12	100		
3	23	91.6	11	91.7		
4	22	91.6	11	91.7	12	100
5	22	91.6	11	91.7	11	91.7
6	22	91.6	10	83.3	11	91.7
7	22	91.6	9	75	11	91.7
8	22	91.6	7	58.3	10	83.3
9	22	91.6	5	41.7	10	83.3
10	22	91.6	3	25	9	75
11	22	91.6	1	0.08	2	16.7
12	22	91.6	0	0	2	16.7
13	22	91.6	0	0	1	0.08
14	22	91.6	0	0	1	0.08
Days	Exposed at day 6		Exposed at day 8		Exposed at day 12	
	Number of embryos	Survival rate (%) of embryos	Number of embryos	Survival rate (%) of embryos	Number of embryos	Survival rate (%) of embryos
1						
2						
3						
4						
5						
6	12	100				
7	12	100				
8	9	75	12	100		
9	4	33.3	12	100		
10	0	0	12	100		
11	0	0	7	58.3		
12	0	0	3	25	12	100
13	0	0	0	0	10	83.3
14	0	0	0	0	5	41.7

**Table 2.** Survival rate of zebrafish embryos in 0.08% ETOH when continuous exposure started at different times of their development, day 2 (*a*), day 4 (*b*), day 6 (*c*), day 8 (*d*) and day 12 (*e*). Control animals were maintained in pure egg-water solution. Survival rate is expressed as a percentage of the starting total number (12) of the embryos in each group.

The second goal of this experiment was to find a sensitive period in which the effect of the low concentration of alcohol could be detected. Our findings indicate that this period falls somewhere between days 8 and 12. This time frame is known as the beginning of the formation of the CNS, when the neuronal plate/tube is formed, and when the early proliferation of neuro- and glioblasts takes place (Westerfield, 2000). It is also known that dividing cells are the most vulnerable to ETOH. In light of this information, it comes as no surprise that this period turned out to be the most sensitive. Published data indicate that there may be several sensitive periods. Perhaps, if we would extend our experiment further, we could also find other sensitive times, probably when other vital organs begin to develop (Cronise *et al.*, 2001).

## **V. Acknowledgements**

The authors express their gratitude to Drs. Eva and George Megerle whose generosity and continuous support made this research possible. Thanks should also be extended to Dr. Brian Palestis for his valuable help in our statistical analysis and to Dr. Donald Stearns whose continuous advice and critical reading of the manuscript was invaluable for the success of this study.

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## **Diagnosis and Treatment of Aeromonas in Zebra Fish**

Jennifer Zafarino, Thomas Smolka and Dr. Kathleen Bobbitt

Presented at the 56<sup>th</sup> Eastern Colleges Science Conference in Niagara, NY

The normal habitat of *Aeromonas* is an aquatic environment. Their presence has been reported throughout the world in fishponds, natural mineral springs, chlorinated and unchlorinated waters as well as other watery environments. Most *Aeromonas* grow well at 37°C, although their optimal growth temperature range is 22-28°C. An experiment being performed by Dr. Fulop at Wagner College involving zebra fish unfortunately became contaminated with a pathogen of unknown origin. After testing the dead fish and culturing the bacteria on various agars, we found the pathogen to be a species of *Aeromonas*. We then performed a series of tests to determine how this pathogen could be treated without harming the zebra fish.

## **The Efficient Solution of Block Tridiagonal Linear Systems**

Peter Herbst and Dr. Gregory J. Falabella

Presented at the 56<sup>th</sup> Eastern Colleges Science Conference in Niagara, NY

The analysis of problems in mathematics, engineering and the physical sciences often involves the solution of a linear system. In matrix notation the problem is written  $Ax=b$  where  $A$  is known as the coefficient matrix. Techniques for solving such a system fall into two general categories: direct and iterative methods. The most popular direct methods are Gaussian elimination and LU decomposition. If an iterative technique is desired Gauss-Seidel iteration or a close variant is used.

Unfortunately, application of the above methods, without modification, to large sparse systems is so inefficient that it prevents the solution of many practical problems. Canned programs such as LINPACK and LAPACK, written specifically for sparse matrices, are available on the web. They, however, are not always flexible enough to be efficiently coupled with a given code.

The current research is an investigation into methods of solving block tridiagonal matrices. A tridiagonal matrix has one band above and one below its main diagonal. All other entries are zero:

$$\begin{vmatrix}
 A_1 & C_1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 B_2 & A_2 & C_2 & 0 & 0 & 0 & 0 & 0 \\
 0 & B_3 & A_3 & C_3 & 0 & 0 & 0 & 0 \\
 0 & 0 & B_4 & A_4 & C_4 & 0 & 0 & 0 \\
 0 & 0 & 0 & B_5 & A_5 & C_5 & 0 & 0 \\
 0 & 0 & 0 & 0 & B_6 & A_6 & C_6 & 0 \\
 \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
 0 & 0 & 0 & 0 & 0 & 0 & B_N & A_N
 \end{vmatrix}$$

A block tridiagonal matrix is a tridiagonal matrix in which each non-zero entry is itself a matrix (e.g. all of the  $A_i$ ,  $B_i$  and  $C_i$  in the figure above are themselves  $n \times n$  matrices). Such systems are often quite sparse and are encountered thousands or even millions of times in the simulation of physical phenomena. As a result techniques to solve them must be very efficient.

The current research examined the effects of different solvers when used in conjunction with a fluid dynamics code to simulate the flow of air about an NACA-0012 airfoil at a  $2^\circ$  angle of attack. First an optimized version of Jacobi iteration was employed. Although highly efficient, the degree of accuracy produced was very sensitive to input parameters and varied greatly (see figure 1). Next LINPACK was used and found to consistently produce accurate results. Unfortunately, it required significantly more CPU time and was so difficult to modify that the resulting code would be unable to exploit different computer architectures.

Lastly, an algorithm for LU decomposition on banded matrices was developed. LU decomposition is a modification of Gaussian elimination in which the coefficient matrix is factored into upper and lower triangular matrices. The system can then be easily solved using back-substitution. In the course of the research it was found that when LU decomposition is performed on a banded matrix, the resulting upper and lower matrices exhibited the same bandwidth as the original unfactored matrix. With this knowledge, a modified LU decomposition code that would only take into account the necessary entries was written. Like the LINPAC code it produced accurate results but took slightly longer to execute on a standard personal computer. However, unlike LINPAC it is highly portable and can be modified for use on parallel and vector processors where it will likely produce truly superior results.

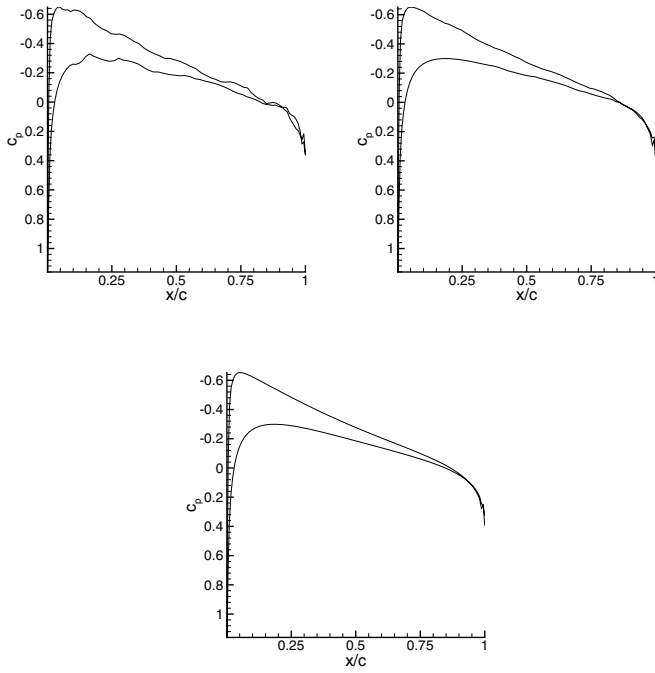


Figure 1: The varying degrees of accuracy obtained when an optimized iterative method was used to determine the coefficient of pressure associated with an NACA-0012 airfoil at  $2^\circ$  angle of attack.





## **Section II: The Social Sciences**



# **How Watching Pornography Immediately Effects Attitudes Toward Sexual Relationships**

Jessica Biren

Research has explored reasons for pornography usage, individual pornographic preferences, the desensitization effect of watching sexual violence, and ways in which pornography might degrade women. The present paper examines the effects of watching a pornographic video on men's expressed aggression toward their female sexual partners. The 35 male participants ( $M=20.89$  years) completed a pornography survey, watched either a control video (a sex scene from an R-rated movie) or an experimental video (a sex scene from a pornographic movie) and then completed a relationship survey. The results indicate that participants exposed to pornography expressed greater likelihood of being a sexual aggressor and reported greater stimulation from viewing hard core pornography and pornographic magazines. Implications include potential ways to decrease the likelihood of sexual aggression against women.

## **I. Introduction**

As Internet users expanded to 92 million people in the US and Canada, "sex" has become the second most common search topic based on a sampling of a million searches (as found by searchterms.com, Goodson, McCormick, & Evans, 2001). Only the term "mp3" is searched more often. Sex is interesting, hard to obtain, and mysterious. One of the most accessible places to obtain information about sex is from pornography. For the purpose of this paper, pornography was defined as any material sexual in nature, but is not necessarily degrading to women, that explicitly shows genitalia and penetration, which in effect excludes R-rated movies.

Several previous studies have examined interesting aspects of pornographic use, including individual preferences (Bogaert, 2001), the person's IQ in relation to the pornographic preference (Bogaert, Woodard, & Hafer, 1999), and what types of pornography are viewed on the Internet (Goodson, McCormick, & Evans, 2001). Goodson et al. (2001) sought to explore college students' Internet usage of pornography. College students were surveyed because they have wide access to the Internet and are

usually highly computer literate. The researchers studied a variety of issues concerning searching the Internet for sexually explicit materials, including the specific behaviors of the participants during the searches and their attitudes while searching. The researchers found that sexually explicit materials on the Internet were elicited significantly more by men than by women.

While Internet access to pornography is an important area to study, it is also important to determine what types of pornographic material students are interested in viewing. Bogaert (2001) found that preferences for sexual media are related individual differences. Males select pornographic material that is congruent with their personalities, fantasies, and sexual experience. Preferences for viewing sexual films were related to a number of the personality components, including measures of aggression and dominance, attraction to sexual aggression, sexual affect, hypermasculinity, sensation seeking, and intelligence. Personality can accurately predict preference for pornography.

Given the widespread use of pornography and its relationship to the personality of users, a question arises about the implications of watching pornography. Mullin and Linz (1995) wanted to determine whether watching sexually violent pornography makes a person more comfortable with actual sexual violence. They hypothesized that after viewing sexual violence on film, men would perceive sexual violence as less degrading, less violent, and less offensive to women than prior to the pornography exposure. The researchers found that after repeated exposure to slasher films, participants rated the films as being less sexually explicit and less sexually violent. Although slasher films are not pornographic, this same theory can be applied to pornography.

Check and Guloien (1989) reported that after frequently viewing dehumanizing pornography, men were more likely to report that they might rape and that they had performed frequent acts of sexual aggression against women. Some research suggests that pornography that degrades women has immediate consequences on how men view women, for example, as primarily used for sex (Schank & Abelson, 1977; Taylor & Crocker, 1981). After watching degrading images of women, viewers overestimated women's sexual desire and sexual receptivity (Donnerstein, Linz, & Penrod, 1987; Weaver, 1987).

Bogaert, Woodard, and Hafer (1999) found that a single exposure to pornography is enough to change male attitudes towards women. The researchers observed that intelligence is related to attitudes towards women. Men lower in intelligence were more sexually suggestive and assertive toward a female confederate after viewing violent pornography. Men higher in intelligence did not have this same reaction. These results suggest that lower IQ men do not understand that the pornography is not related to how they should treat women.

Is it necessary for men to watch pornography to change their treatment of women? Milburn, Mather, and Conrad (2000) studied whether R-rated movies are sufficient to objectify women. When a rape is portrayed, even in an R-rated movie, male participants perceived that the female victim derived some pleasure from the action. The results indicate that watching R-rated movies with a rape scene alters the way men perceive the scene and lessens their perception of the victim's suffering. Abbey (1982) found that when women watch films that are degrading to women, they are at an increased risk of sexual assault.

All of this research invokes an extremely negative view of the effects of pornography. Women may be physically hurt by men who watch film containing any form of degrading sexual acts, regardless if the film is R-rated or pornographic. The purpose of the present paper was to examine how watching pornography video immediately influences male attitudes towards sexual relationships. After watching pornography, men will be sexually stimulated and desire sexual intercourse. Men who want sexual intercourse after watching pornography will be more likely to express their desire to be more aggressive to their female sexual partners.

## **II. Method**

### Participants

The participants of this experiment were 35 male undergraduates currently enrolled at Wagner College. The participants ranged in age from 19 to 26 with a mean age of 20.89 ( $SD= 1.73$ ). The academic year for the participants ranged from freshmen to senior year, with the average participant in his junior year ( $M= 3.26$ ,  $SD= 0.89$ ).

### Procedure

Students in Introduction to Psychology, in Social Psychology, on the football team, and in a campus fraternity were invited to participate in the study. The students who accepted the invitation were told that they were strictly volunteers and were able to leave the study at any time without penalty. Informed consent was obtained prior to the study.

Participants first completed a survey about pornography (found on the Internet at Queendom.com, an online psychological testing agency, see Appendix A). Some sample questions include: Which of these forms of pornography have you been intentionally exposed to more than twice in your life? Have you ever had a dispute or experienced tension in your relationship because of your own use of pornography? Have you ever felt that you may have neglected your partner emotionally or sexually because of pornography?

Sessions of the study occurred at four different times over two evenings. Each session was randomly assigned to one condition of the study. The control group was shown a five-minute clip of a sexual encounter found in an R-rated movie (Ghost, 1990). The students in the experimental group were shown a five-minute clip of a sexual encounter found in a pornographic movie (Dreamquest, 1999). Both film segments depicted a man and woman having consensual sexual intercourse. Ghost showed the couple touching one another above the clothing, but did not show any nudity. Dreamquest showed the naked couple's genitalia and penetration. During both of the film segments, the experimenter remained outside of the experimental room to ensure that all conditions were treated the same.

After both the control and experimental groups finished watching the film segments, the participants were asked to complete a second survey (see Appendix B). This survey included the dependent measures of immediate attitudes toward sexual partners and included measures of the participants' past, current, and future intimate relationships. Some sample questions include: After watching pornography, are you more likely the aggressor? Do you feel more stimulated after watching hard core pornography than watching soft core pornography? Are you stimulated after looking at dirty pictures/magazines?

Following the collection of the completed surveys, the participants were fully debriefed and given an opportunity to ask any questions they may have had about the study.

### **III. Results**

On the survey administered prior to the film segment, participants reported that the mean age of first exposure to pornography was 12.56 (SD= 2.97), with responses ranging from 4 years old to 20 years old. (One participant refrained from answering the question.) The participants were exposed to pornography on average between several times a week to several times a month (M= 3.40, SD= 1.12, response options ranged from several times a day to never). Most students rated the average amount of time spent online viewing pornography as falling between a small percentage to about one-quarter (M= 1.34, SD= 1.01, response options ranged from several times a day to never). The participants who had engaged in sexual intercourse reported their age of first sexual intercourse at a mean age of 17.13 (SD= 1.85), with responses ranging from 12 to 20. Five participants reported that they had not yet engaged in sexual intercourse.

Given that random assignment occurred by session rather than by participant, a problem may have arose. The experimental condition included more football players and fraternity members than did the control condition.

After the manipulation of the film clip, responses on several measures differed by experimental condition. The item (Question 17), that asked, “After watching pornography, are you more likely the aggressor?” participants in the experimental condition were more likely to respond “yes, always” than were participants in the control condition,  $\chi^2(2) = 10.79, p < .01$ . (See Table 1.)

When participants were asked, “Do you feel more stimulated after watching hard core pornography than watching soft core pornography?” (Question 19), participants in the experimental condition answered “yes, always” more frequently than did participants in the control condition,  $\chi^2(2) = 9.13, p = .01$ . (See Table 2.)

When participants were asked, “Are you stimulated after looking at dirty pictures/magazines?” (Question 20), the experimental group answered “yes, always” more frequently than did the control group,  $\chi^2(2) = 6.66, p < .05$ . (See Table 3.)

Some results were consistent for both groups on the relationship survey. The participants reported their longest relationship as lasting an average of 1-2 years ( $SD = 1.65$ , response options ranged from 1 month to 3+ years). The sexually active students rated their sexual activity while in a relationship between several times a week and several times a month ( $M = 3.51, SD = 1.34$ , response options ranged from several times a day to never). The participants had told an average of 2.49 people they loved them ( $SD = 1.54$ , with responses ranging from zero to five or more). The participants envisioned themselves getting married around 4-5 years from the present ( $SD = 1.11$ , response options ranged from this year to 6+ years). (See Table 4.)

#### **IV. Discussion**

The present study demonstrated that participants who were exposed to pornography found pornography to be more sexually stimulating. Both the experimental and the control groups admitted to high rates of prior exposure to pornography, although the experimental group admitted to more prior exposure. It is possible that the participants in the control group may have answered protectively and were unwilling to divulge the truth. Since the experimental group was largely composed of football players and fraternity brothers, it was possible they were more comfortable and answered the questions more honestly or that the groups to which they belong encourage greater use of pornography. In future research, random assignment should occur at the level of the participant rather than at the level of the session. Since so many of the experimental participants were familiar with each other (football players and fraternity brothers), future research should be conducted to explore whether viewing pornography in familiar groups affects responses.

This study found that watching pornography increased stimulation, while Mullin and Linz (1995) would have predicted that repeated exposure to pornography would

cause the participants to rate the films as being less sexually explicit and less sexually violent. The possible implications for watching sexually explicit pornography are threatening to female sexual partners.

Another area of concern to female partners is heavy pornography usage. When women discovered that their partner was a heavy pornography user, the women felt violated; even though the men were not actually in contact with other women, they viewed watching pornography as a form of infidelity (Bergner & Bridges, 2002). Women began to lessen their significance in the relationship due to their partner's pornography usage. Women viewed themselves as sexually undesirable, worthless, weak, and stupid when they learned their partner used pornography. Women considered their partner to be a sexual pervert or sex addict, a liar, unloving and selfish, and an inadequate father and husband.

Check and Guloien (1989) and Abbey (1982) discussed the potential for female sexual assault after willingly watching pornography with a male partner. The participants in this study responded that after watching pornography, they are much more likely to be the aggressor. The implications for these results are that women may actually be increasing their likelihood of sexual assault; on the reverse, women may reduce their likelihood of sexual assault by refusing to watch pornography with a male partner. Future research needs to be conducted to test this relationship on a larger level and to see if refusing to watch pornography decreases the likelihood of sexual assault. One future research model would be to follow this paper's experimental design, but instead of having any volunteers participate, the study would only test men in serious relationships. Post experiment, the experimenter would interview the women in the relationships and find out if their sexual activity changed and how due to men watching pornography.

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### **Appendix A: Pornography Survey**

Please affix label in upper right hand corner.

Please answer all questions as honestly as possible.

1. What is your age? \_\_\_\_\_
2. What is your sexual preference? \_\_\_\_\_

3. What is your marital status?
  - a. I don't want to answer
  - b. Single, living in a dorm or apartment with a roommate
  - c. Single, living alone in a dorm or apartment
  - d. Single, living with parents
  - e. Single, living with girlfriend or boyfriend
  - f. Married
  
4. What is your current academic year?
  - a. Freshmen
  - b. Sophomore
  - c. Junior
  - d. Senior
  
5. Have you been sexually active in the past year?
  - a. I don't want to answer
  - b. Yes
  - c. No
  
6. How old were you when you lost your virginity? \_\_\_\_\_
  
7. How old were you when you were exposed to pornography for the first time? \_\_\_\_
  
8. Which of these forms of pornography have you been intentionally exposed to more than twice in your life? (Circle all that apply)
  - a. Soft core porn movies
  - b. Hard core porn movies
  - c. Soft core porn magazines/pictures
  - d. Hard core porn magazines/pictures
  - e. Soft core online porn
  - f. Hard core online porn
  
9. How often are you exposed to any kind of pornography?
  - a. I don't want to answer
  - b. Almost every day
  - c. Several times a week
  - d. Several times a month
  - e. Several times a year
  - f. Less than twice a year
  - g. Never
  
10. How much of your online time is spent at porn sites?
  - a. I don't want to answer
  - b. All of it

- c. Most of it
  - d. About half
  - e. About one-quarter
  - f. A small percentage
  - g. None
11. Have you ever paid for access to an online porn site?
- a. I don't want to answer
  - b. Yes
  - c. No
  - d. I never visited one
12. Has online porn been responsible for an increase in your porn consumption?
- a. I don't want to answer
  - b. Yes
  - c. No
  - d. Never visited an online porn site
13. Which form of pornography do you find most sexually stimulating?
- a. I don't want to answer
  - b. Soft core porn movies
  - c. Hard core porn movies
  - d. Soft core porn magazines/pictures
  - e. Hard core porn magazines/pictures
  - f. Soft core online porn
  - g. Hard core online porn
  - h. None
14. When you use pornography with your partner, do you feel guilty or ashamed?
- a. I don't want to answer
  - b. Yes
  - c. A little bit
  - d. No
  - e. I have no experience with this
15. When you use pornography alone, do you feel guilty or ashamed?
- a. I don't want to answer
  - b. Yes
  - c. A little bit
  - d. No
  - e. I never use porn alone
16. Would you be hurt or offended if you learned that your partner was enjoying non-violent pornography in your absence?
- a. I don't want to answer
  - b. Very

- c. A little bit
  - d. No
17. Would you tell your partner if you bought a porn magazine, watched a porn movie, or visited an online porn site?
- a. I don't want to answer
  - b. Yes
  - c. No
  - d. Maybe
  - e. I have never exposed myself to porn
18. Have you ever had a dispute or experienced tension in your relationship because of your own use of porn?
- a. I don't want to answer
  - b. Yes
  - c. No
  - d. I have never exposed myself to porn
19. Have you ever had a dispute or experienced tension in your relationship because of your partner's use of porn?
- a. I don't want to answer
  - b. Yes
  - c. No
  - d. To my knowledge, my partner has never exposed him/herself to porn
20. Have you ever felt that you may have neglected your partner emotionally or sexually because of porn?
- a. I don't want to answer
  - b. Yes
  - c. No
21. Have you ever felt that your partner neglected you emotionally or sexually because of porn?
- a. I don't want to answer
  - b. Yes
  - c. No
22. What is the main reason for your use of pornography?
- a. I don't want to answer
  - b. Aide for masturbation (when I'm alone)
  - c. My sex life is not satisfying enough
  - d. My partner insists
  - e. Sexual stimulation for my partner and me
  - f. Curiosity
  - g. Educational purposes
  - h. For fun, with my friends

- i. Boredom
- j. I'm hooked
- k. To fulfill my peculiar sexual needs
- l. I don't use porn

### **Appendix B: Relationships Survey**

Please affix label to upper right hand corner.

Please answer all questions as honestly as possible.

1. Are you currently involved in an intimate relationship?
  - a. I don't want to answer that
  - b. Yes
  - c. No
  
2. Have you ever been involved in an intimate relationship?
  - a. I don't want to answer that
  - b. Yes
  - c. No
  
3. Would you like to be involved in an intimate relationship?
  - a. I don't want to answer that
  - b. Yes
  - c. No
  
4. How long was your longest relationship?
  - a. I don't want to answer that
  - b. 1 month
  - c. 2-6 months
  - d. 7-12 months
  - e. 1-2 years
  - f. 2-3 years
  - g. 3+ years
  - h. I have never been in a relationship
  
5. Do you want to have a long-term relationship?
  - a. I don't want to answer that
  - b. Yes
  - c. Maybe
  - d. No
  
6. Were you sexually active during the relationship?
  - a. I don't want to answer that

- b. Yes
  - c. No
7. How often were you sexually active?
- a. I don't want to answer that
  - b. Several times a day
  - c. Several times a week
  - d. Several times a month
  - e. Several times a year
  - f. Less than twice a year
  - g. Never
8. Would you say that you were ever in love?
- a. I don't want to answer that
  - b. Yes
  - c. No
9. How many people have you told that you love them?
- a. 1
  - b. 2
  - c. 3
  - d. 4
  - e. 5 +
10. Have you ever introduced someone that you are in love with to your parents?
- a. I don't want to answer that
  - b. Yes
  - c. No
11. Have you ever introduced someone that you are in love with to your friends?
- a. I don't want to answer that
  - b. Yes
  - c. No
12. Do you want to get married?
- a. I don't want to answer that
  - b. Yes
  - c. Maybe
  - d. No
13. In how many years from now do you envision yourself getting married?
- a. I don't want to answer that
  - b. This year
  - c. Next year
  - d. 2-3 years
  - e. 4-5 years

- f. 6 + years
  - g. Never
14. In a sexual relationship, are you the aggressor?
- a. I don't want to answer that
  - b. Yes, always
  - c. Yes, sometimes
  - d. No, never
15. Have you ever fantasized about being the aggressor?
- a. I don't want to answer that
  - b. Yes, always
  - c. Yes, sometimes
  - d. No, never
16. Does there need to be an aggressor in a sexual relationship?
- a. I don't want to answer that
  - b. Yes
  - c. Maybe
  - d. No
17. After watching pornography, are you more likely the aggressor?
- a. I don't want to answer that
  - b. Yes, always
  - c. Yes, sometimes
  - d. No, never
18. After viewing pornography, are you more sexually stimulated?
- a. I don't want to answer that
  - b. Very
  - c. A little bit
  - d. No
19. Do you feel more stimulated after watching hard core pornography than watching soft core pornography?
- a. I don't want to answer that
  - b. Very
  - c. A little bit
  - d. No
20. Are you stimulated after looking at dirty pictures/magazines?
- a. I don't want to answer that
  - b. Very
  - c. A little bit
  - d. No

21. Do you desire to have sexual intercourse after watching pornography?
  - a. I don't want to answer that
  - b. Very
  - c. A little bit
  - d. No
  
22. Do you desire your usual sexual partner?
  - a. I don't want to answer that
  - b. Yes, always
  - c. Yes, sometimes
  - d. No, never
  
23. Do you desire that star of the pornography?
  - a. I don't want to answer that
  - b. Yes, always
  - c. Yes, sometimes
  - d. No, never
  
24. Do you want to have a long term relationship?
  - a. I don't want to answer that
  - b. Yes
  - c. Maybe
  - d. No



Table 1: Responses to More Likely to be the Aggressor (Question 17) by Condition

Condition	Response		
	Never	Sometimes	Always
Control	14.71%	32.35%	0%
Experiment	2.94%	26.47%	23.53%

*Note.*  $n = 34$  for each condition.

Table 2: Responses to More Stimulation from Hard Core Pornography (Question 19) by Condition

Condition	Response		
	Never	Sometimes	Always
Control	29.41%	11.76%	5.88%
Experiment	8.82%	14.71%	29.41%

*Note.*  $n = 34$  for each condition.

Table 3: Responses to Stimulation After Looking at Dirty Pictures/Magazines (Question 20) by Condition

Condition	Response		
	Never	Sometimes	Always
Control	5.88%	41.18%	0%
Experiment	8.82%	29.41%	17.65%

*Note.*  $n = 34$  for each condition.

Table 4: Responses to Variables on the Pornography Survey

Variable	Condition				t-test
	Experimental		Control		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Soft Core Movies	0.84	0.37	0.56	0.51	t(33)=1.86, p<.10
Hard Core Movies	1.00	0.00	0.56	0.51	t(33)=3.73, p<.01
Soft Core Magazines	0.89	0.32	0.63	0.50	t(33)=1.94, p<.10
Hard Core Magazines	0.84	0.37	0.44	0.51	t(33)=2.69, p<.05
Soft Core Online	0.74	0.45	0.44	0.51	t(33)=1.84, p<.10
Hard Core Online	0.84	0.37	0.38	0.50	t(33)=3.16, p<.01
Exposure Frequency	3.84	0.96	2.88	1.09	t(33)=2.80, p<.01
Feeling Guilty	1.54	0.78	2.00	0.00	t(33)=-1.87, p<.10

# **The Change of Color and Shapes and Its Effects on the Memory Of a Pattern**

Diane Marie Vellon

## **I. Introduction**

Upon reading my psychology textbook, I came across an interesting study by John Ridley Stroop that sparked my interest. Stroop concluded that it is a simple task to quickly recite color words such as red when the letters are written in red, however it is quite a task to quickly recite the word red when its letters are written in a color other than red with other similar words in a group (1999, p.99). There have been many studies on color and memory, such as Stroop's Effect, however I thought it would be interesting to manipulate color in respect to a pattern. Psychologists use patterns and shapes of different colors to test their patients for numerous studies and counseling sessions as well.

Non-declarative or procedural kinds of memory include the acquisition, retention, and retrieval of knowledge expressed through experience-induced changes in performance. These kinds of memory are measured by indirect or implicit tests where no reference is made to that experience. Skill learning, repetition priming, and conditioning are classes of implicit tests that often reveal procedural memory processes dissociable from declarative memory (1998).

Although I did not find much research on how the change of color has an effect on the recollection of a pattern, I did my own research on memory retrieval and conducted my own experiment on the topic.

The hypothesis for this study states that the change in color of the shapes will have an effect on the memory of a pattern given. The two variables in this study being correlated are colors and memory of a pattern.

## **II. Method**

### **Participants**

For this study a sample composed of thirty-three subjects were used. This sample includes both males and females. The age range of these subjects fall between sixteen and thirty. The participants all varied in job and grade status. The subjects for this study were randomly selected by the researcher by asking each individual to participate in the study. Participants were all informed that the information from the results would be used for a study on memory and thinking in a cognitive psychology class at Wagner College. These participants were also notified that the data would remain confidential to the study's researcher and observing professor. The researcher randomly selected the sample and the test was given to acquaintances and friends of the researcher. The majority of the participants are currently enrolled in high schools or colleges in New York City. The remaining individuals hold jobs in New York City. The participants expressed to me that they had never partaken in a study of this kind when they had to recreate a pattern with two sets of colors. Two of the participants had counseling sessions in the past and have had to recreate a pattern given by their psychiatrists in their sessions.

### **Materials**

The materials used for this study's data collection is a pattern shown in Appendix A and a collection of shapes in two different sets of colors. The researcher specifically for this research designed this pattern selected for each subject to use. The pattern consists of the same shapes with five different colors. The subjects were given a bag of shapes in the the same colors as the pattern. Later on, the participants were given another bag of shapes in a different set of colors to recreate the same pattern they had previously.

### **Design**

The design for this study is a correlational design in which two variables, color and memory of a pattern to determine whether change in color has an effect on the memory of a pattern.

## **III. Procedure**

The procedure for this study entails the researcher to have created a pattern for thirty-three subjects to visualize and collected and placed separate shapes of different colors into individual bags for each participant to take along with the pattern. For this study, the participants range in age from sixteen to thirty. This range in age was not made for any other purpose but to make it easier for the researcher to find subjects to take part

in the study. The subjects were asked to look at a pattern then recreate it with one set of colored shapes. The subjects were then asked to place those shapes back into the bag and return them to me. With the other bag of different colored shapes, the participants were asked to recreate the same pattern they visualized and recreated before. There was no time limit given to the participants to complete the task in order to avoid any arousal, anxiety, or frustration level that a time constraint can bring about. The experiment was conducted only to determine a correlation between the change in color and the memory of the pattern.

#### **IV. Results**

The data for this study was arranged by accuracy according to the researcher on a scale of one to three. For example if the participant put the pattern (Appendix A) together for the most part with the different color shapes, then they received a one. If the subject recreated some of the pattern together but with a number of mistakes, the subject received a two. And finally, if the subject did not recreate the pattern well at all, they received a three.

Table 1 refers to the results of both recreations of the pattern. Column 1 is the first pattern with the original colors and Column 2 is the second pattern with the different set of colors. In the first column, most of the subjects recreated the pattern accurately with the original colors. The percentage of participants who scored a one on the first column is 69.69%. The participants who scored a number two on the first try were 18.18%. Finally, 9.09% of the participants scored a three on the first pattern. 51.51% of the participants scored a three on the second pattern with the different color shapes referred to Column 2. In Column 2, 30.30% of the population received the score of two. 15.15% of the sample received a score of one.

#### **V. Discussion**

From the data collected, there is a level of significance that supports the hypothesis previously given. With the change of colors, the memory and retrieval of a pattern was affected. This data can determine that there is a relationship between color change and memory. The pattern in this study was never changed. Each subject was shown the pattern and were then asked to recreate the pattern as seen. The colors in the first bag were the same as the original pattern. After the colors of the shapes changed in the pattern recreation, the accuracy of the pattern structure changed.

For future research, one could experiment on the accuracy in children, adolescents, and adults. The pattern can be modified to accommodate each of the suggested groups of people. Another experiment could be a different shape used or

different shapes used all together in a pattern. One could tell the relationship between males and females in their study as well.

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**Appendix A: Color Pattern**

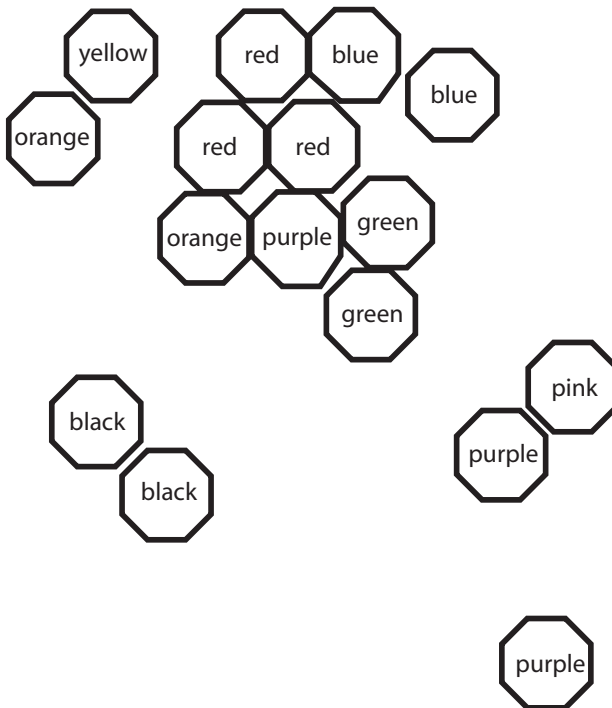


Table 1: Rating Scores of Accuracy On the Color Pattern

<u>Subject #</u>	<u>Column 1</u>	<u>Column 2</u>
1	1	3
2	1	3
3	2	3
4	1	2
5	1	1
6	1	2
7	3	3
8	2	2
9	1	1
10	2	1
11	1	3
12	1	3
13	1	2
14	1	2
15	2	3
16	3	3
17	1	2
18	2	3
19	1	3
20	1	2
21	1	2
22	1	2
23	2	3
24	1	3
25	1	1
26	3	3
27	1	3
28	1	1
29	1	3
30	1	2
31	1	3
32	2	3
33	1	2

# **Taking the Job Home**

Melissa Mason

In today's society, a lot of people "take the job home" with them, which can lead to unnecessary stress, family trouble, and in some cases, fear; but no matter the consequences, it still happens everyday. This study was completed on a female New York City police officer to determine the extent of negativity a professional can experience before it becomes a problem outside of the workplace. It has been concluded that this police officer, after witnessing the evil in people, has in fact brought home unnecessary stress as a result of her job.

## **I. Introduction**

I plan to do a case study on a New York City police officer. With such a career, one may see and experience many traumatic and heart-breaking situations that can lead to constant fear or sorrow even outside the workplace. It can also lead to Post-traumatic Stress Disorder (See table 1 and 2 for symptoms) (Sugimoto, 2001). As a New York City police officer today, one may be incapable of dealing with their everyday life since witnessing the evil in people (especially the recent World Trade Center attacks). After this study, I hope to be able to generalize a conclusion about how this job (being a police officer) is affecting a persons' home life, based on her responses to my questions. My goal is to determine whether or not a New York City police officer can go on about their life after witnessing the worst that evil has to offer; things that the laypersons of America may be oblivious to.

I would like to determine if her job as a police officer, especially since the World Trade Center attacks, has effected her relationships, sleep habits, perspectives, and her life overall. I hope to answer the question: "Do you bring the job home?"



## **II. Procedure**

### Method

For this case study, I did a personal interview with the police officer. I was interested to see if she has been classically conditioned to fear. During the interview I asked questions that pertain to experiences that she has encountered since becoming a police officer. I also asked about her feelings toward the job and if it has changed her in any way. I was curious to ask how both she and her job have been altered since the World Trade Center attacks.

### Subjects

A 43-year-old female New York City police officer was the subject of this study. She has been an officer for over 20 years and has enough experience in the field to make a good study.

### Materials

I used a personal interview to ask specific questions about her career, and also her stress, anxiety, and fear level.

## **III. Results**

### Interview

1. How long have you been a New York City police officer? *A little over 20 years.*
2. Do you enjoy your job? *Yes-very much.*
3. What made you choose this as a career? *As a kid, I always looked up to the cops in the neighborhood. I used to tell myself that one day I would be like them. And so I did. Just like that. I never really thought about it-I just did it.*
4. What does your job entail? *Well, a few years ago I decided to get off the streets and stay in the office, so I mainly do paperwork all day. Before that, I just did your usual arrests and tickets, etc.*
5. How does your family feel about your career to the best of your knowledge? *Well, my kids never really liked the fact that I am a cop (laughs). They think it makes me too strict. But other than that, I've never felt that my family disagreed with my career choice.*
6. Has having this career caused any trouble in your relationships with family and friends? *No. Not anymore since I've moved into the office. When I was on the streets I had crazy hours. Sometimes that caused fights between me and my husband, but now things are great.*

7. Has being a police officer caused you to change your views, habits, ideals, etc., in order to better perform your job? *I don't think so. I grew up in Brooklyn, so I was raised to stick up for the family and do what your told. I learned early how life was out there. Brooklyn was all the school I needed to see what people are really capable of. Since becoming a cop, nothings changed. People are still the same, but I was ready for them.*
8. Over the years, have you encountered many disturbing incidents or crimes? (Other than the recent World Trade Center attacks) *Yeah. I think any crime is disturbing. Even something as small as a kid stealing a pocket book is something that really pisses me off. I never understood how people could have so much evil inside them. I always knew they had it-but I never understood why. I still don't.*
9. Describe, if possible, what sticks out about those crimes to this day. *Well, one night I went on a call. It was a call from a woman and she was crying so much that we couldn't understand her. Without getting too graphic, I went to the house and her son was lying on the floor covered in blood and seizing. He had been stabbed several times amongst other things you know. Anyway, by the time the ambulance came, he died in her arms. I remember the look on her face and it's something I could never forget. Oh-the boy was five years old.*
10. Since these crimes and or incidents, have you noticed any changes in yourself? (e.g. sleep habits, work routine, etc.) *Sometimes I have trouble sleeping after seeing something like that. It usually only lasts a few days though since there's always another sad story to replace it. But I never needed therapy for it or anything if that's what you mean.*
11. Has there been a change in your perspectives or views of people and human nature? *Well, people make me sick sometimes you know? I've sort of become paranoid. I trust no one.*
12. Do you find yourself treating people differently after seeing the worst of evils in people? *I never judge a person when I first meet them, but I never put evil past someone.*
13. Has there ever been a situation you could not control, or a time where you could not help someone? Explain. *Of course. I can't be at every call, every night. But for those calls I do go to...not really. I mean, there was that little boy I was telling you about. I couldn't help him. And the World Trade Center-what a mess that was. I wasn't there for that, but even if I was, I don't think that would've been something I could control. I could've helped, but other than that...I don't know.*
14. Were you on duty during the recent World Trade Center attacks? *Yeah I was on duty, but I was in the office doing paperwork.*

15. When was the first time you were able to see the result of the attack? *Later that night. We went down there to the city to help out as much as we could.*
16. If possible, can you describe what you saw and how it made you feel? *Actually if it's alright, I'd rather not get into that. It's still a sore spot. All I can really say is that I've never felt so weak and powerless in my life.*  
In the past few months:
17. Have you lost sleep, had nightmares, or any other change in your routine sleep habits? Explain. *I have lost more sleep in the last few months than in my entire life together. Nightmares? They're so common for me now, that I just call them dreams. I tell you what, sometimes I'd rather not go to sleep because I don't want to see the building fall not even one more time.*
18. Have you had any unusual changes in eating habits? *Not really. The first few days I didn't eat much, but then I started eating again. That really hasn't been a problem.*
19. Do you feel you have become more anxious or fearful when going to work everyday not knowing what may happen? *Of course. Isn't everyone? How can anyone in New York not be scared of being helpless right now? We just have to sit back and take it I guess.*
20. Have you noticed, or been told that you have been acting differently towards your family, friends, co-workers, etc.? Explain. *Not really. I think I'm pretty good at keeping my feelings in until I'm in the right place you know. I don't need to bring anyone else down. I don't think my family even knows how much this bothers me.*
21. Do you think it would help to share your feelings with your family? Maybe they feel the same way. According to Ronald Burke, it may be better to talk it out with someone close to you as a way of coping (Burke, 1998). *I know they feel the same way. But I have to be the strong one. Sometimes I not strong, but my kids shouldn't have to see that.*
22. Have you had any unusual emotional changes whether emotions are absent or present in excess? (E.g. sadness, fear, joy, etc.) Explain. *Yeah. Well fear and sadness of course. I've had a lot of anxiety too. I find my heart racing sometimes for no reason.*
23. Did you ever consider getting that checked by a doctor? *No. Anxiety is what keeps me on my toes.*
24. Have there been any changes in your relationships both with family and friends? Explain. *No. Like I said, I keep a lot of things to myself. Some things don't need to be broadcast.*
25. Any other changes in your life since the World Trade Center attacks? *No not really. I mean, nothing specific. Nothing I can think of off hand.*

26. Are you proud of all your accomplishments as a police officer? Do you ever wish you could've done more or have you ever felt you've done too much? *I'm very proud of myself. I don't think I could ever do too much as a police officer. I definitely haven't done enough. I'm nowhere near done yet. I'll be here to protect and serve for another 10 years at least.*
27. Have you become a different person? Meaning, has your career changed you in any way? Explain. *No I don't think so. Like I said, growing up in Brooklyn will prepare you for anything, so there's nothing that could shock me or change me permanently. I've seen terrible things, but I keep my sanity through it all.*
28. Have you ever questioned your career choice or considered changing careers? *Never. I'm doing exactly what God put me here to do.*
29. Experiencing all that you have, would you say your career has been a positive or negative experience overall? *Both. Positive for all the good things I've been able to do for people and negative for all the evil people and tragedy in this world that I had to see.*
30. Briefly describe how being a police officer has changed or effected your life from your first day on the job until now. *Well, I'm affected on a daily basis by my job, but nothing sticks. The only thing that sticks are the good things I get to do for people. Now that-that's what makes every day worth coming to work.*

### Discussion

After completing the interview with this police officer, my hypothesis looks very weak. It is still not something I can generalize a conclusion from since it was not a true experiment, but it is a good look at the real words of a real police officer that has experienced tragedy at its worst. By the answers to some of my questions, she seems to have an increased level of anxiety, fear, and stress, since the recent attacks in New York City. This is one way to show how she brings the job home, except for the fact that these events have past not long ago, which can reasonably result in prolonged emotional roller coasters. This study has not been a great success. Perhaps the hypothesis was chosen hastily or the interview questions in the wrong concentration or the data incomplete; but either way, this study has not proven to be one of strength or stability. No results have come from it, and conclusions cannot be drawn. It has only proven to be somewhat of common sense married to a sad story. One hypothesis, though not my intention, has been proved; and it is that America is still hurting from this tragedy and just wishes to be left alone. People are not ready to talk. People are not ready to feel. Today is a day to heal.

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## **Section III: Critical Essays**





## The Representation of Class in Chaucer

Eric DeBarba<sup>1</sup>

*The bourgeoisie, wherever it has got the upper hand has put an end to all feudal, patriarchal, idyllic relations. It has pitilessly torn asunder the motley feudal ties that bound man to his "natural superiors" and has left remaining no other nexus between man and man...than callous "cash payment."*

--Karl Marx, *Manifesto of the Communist Party*

*International trade, diplomacy, and travel were making Englishmen aware of an Italian grandeur that did not stem from noble blood running through the veins of long-established families but was evident in men of business with cultivated tastes.*

--Barbara Hanawalt, *Chaucer's England*

*Vileyns sinful dedes make a cherl...Thy gentillesse cometh fro God alone.*

--Geoffrey Chaucer, *The Wife of Bath's Tale*

The issues of class and gentility are prevalent throughout the *Canterbury Tales*. Geoffrey Chaucer himself was a scion of the rising commercial class and expresses many of his class's ideals throughout his writing. The England of Chaucer was grappling constantly with the issue of class, as the old feudal society of three orderly estates was dying and the commercial bourgeoisie was on the rise. What would emerge to take the place of feudalism, fueled by foreign trade and conquest, was a new mode of production that in the nineteenth century Karl Marx would call capitalism. Marx believed that the period of history in Chaucer's England in particular was important to the way in which capitalism would develop. As the bourgeoisie gained in strength both economically and politically, they sought for themselves a social position denied within traditional feudal society. Both Chaucer and Dante wrote redefinitions to help the middle classes gain

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<sup>1</sup> Paper written under the direction of Dr. Anne Schotter for English 303 Chaucer

recognition within the social world. Throughout his *Canterbury Tales* Chaucer assigns to the middle class values both positive and negative, including those of individualism, commerce, and gentility not based on birth. In the *Franklin's Tale* and the *Wife of Bath's Tale* in particular the ideals are represented by the pilgrims who tell the tales and in the tales themselves.

The mode of production that had predominated in Europe from the fall of Rome to the beginning of the fifteenth Century was feudalism. In this economic system, at least in theory, either the sovereign or the Church held all the land. The sovereign, be he a king, prince or emperor, parceled out the land to nobles, who parceled it out to smaller nobles. The land was worked entirely by serfs who were bound to the land and in the strictest stage of feudalism could not leave it. The serfs worked the nobles' land in exchange for protection and the aristocrats gave them as soldiers to the sovereign in the event of a war. This system functioned well for centuries following the collapse of central Roman authority. The Church had taken a lot of power because at that time it was the only remaining central authority that could transcend both ethnic and linguistic barriers. Thus, the Church had a privileged position and had the right to demand tribute from sovereigns and tithes from nobles as well as serfs.

Medieval society was divided into three "estates" or classes. The First Estate was the clergy, "those who pray". The Second estate was the aristocracy both landed and unlanded, "those who fight." The Third Estate was made up of the peasants and serfs, "those who work," who made up ninety percent of the populace (Bisson, pp.144-145). The estates, which had long comprised the structure of medieval society, are reflected in the *Canterbury Tales*. There are three pilgrims that represent the ideal of each estate: the Parson, the Knight and the Plowman. All three of these figures in their behaviors represent what characterizes the perfect class system of medieval society. None of these figures is very well defined; they are very generalized because they are meant to stand for the three orders of society (Saul, p.45). In the *General Prologue*, Chaucer as the narrator says that it is important to report on the "condicioun" and "degree" (37-49) of each of his fellow pilgrims. He goes even further in emphasizing their station when he apologizes for not having "set folk in hir degree" and states that it is because "my wit is short, ye may wel understonde"(744-746). It is disputed whether this passage is an example of the traditional modesty expressed by medieval writers or if he is implying that only a very intelligent person could "reproduce the degree of all the pilgrims without error" (Knapp, p. 13). This statement also suggests that the social hierarchy was so ingrained in Chaucer's England that readers might possibly notice mistakes made in the order of the pilgrims' social standing (Knapp p.13). In the extremely class-conscious and tumultuous

world of late medieval England, people were very interested in status, lineage and values. The estates theory is but one of many ideas that characterized what it is that made someone “gentle” or “noble.” The dominant ideal, though, was that espoused by the second estate or aristocracy, which centered on the values of chivalry backed up by noble lineage. This vision of gentility is expressed by Chaucer’s Knight in his rather longwinded tale about Arcite and his brother Palamour (Rosenthal p.21).

The Second Estate dominated the Feudal mode of production, although at times it was overshadowed by the influence of the clergy. Aristocratic influence in English society would remain (although diminished) into the early twentieth century. In feudal times, though, the aristocracy was in control and after the Magna Carta their influence only grew. The central ruling ideal of the nobility was the code of Chivalry, which was supposed to be practiced only by members of the noble class. The code of Chivalry is often not understood by modern readers, who have conceived of it as a pattern of elaborate ritual and pageantry in which honorable knights compete for the love a lady through their exaggerated feats in battle and in their war-games, as portrayed in medieval literature (Bowden, p.17). In theory, chivalry was a moral code that was based on decent behavior, but until after the First Crusade it was not really put into practice very much (Bowden, p.18). The chivalric knight was supposed to spend his time fighting in wars against “heathens” and not against other Christians. Also important is the emphasis put on honor, particularly on keeping chivalric oaths. In the twelfth and thirteenth centuries the courtly love aspect came into play. This was due to a number of factors including the rise of war games and the cessation of long drawn out warfare (Bowden, p.19). These factors coupled with a more prosperous and stable society as a whole, allowed courtly love to take hold among aristocrats. In order for knights not to remain idle, they began to engage in jousts, during which men and women sat together as spectators. With that, the activity of courtship merged somewhat with the sport of jousting. The knights no longer just fought for themselves, but for the honor of women for whom they acted as servants in all things. Critics disagree as to whether courtly love had as large a role as appears in medieval literature. According to Muriel Bowden “love affairs grew to be as important as the fighting for Church and state”(p.19). Courtly love gradually worked its way into the expectations of what was to be considered gentle behavior, but it was never formally a part of the chivalric code.

The aristocratic notion of gentility was based on two key attributes, lineage and virtue. A person’s parentage was held to be the essential prerequisite for being gentle. Two main theorists on this topic were Oliver de la Marche and Beaumanoir, who both believed that aristocratic lineage was absolutely necessary in order for one to be considered gentle (Saul, p.41). De la Marche states that “the gentleman is he who of old springs from gentlemen and gentlewomen and such men and their posterity by marriage

are gentle” (Saul, p.41). He did believe that lineage was necessary, but to be truly gentle one also had to behave in a virtuous way. Therefore someone with good lineage could be considered churlish based on his or her behavior. The fourteenth-century jurist Beaumanoir, in contrast, believed that “lineage was a consequence of virtue” because the ruling class was made up of the descendants of those people who after the fall were most fit to look out for the majority because of their intellect, strength and fairness (Saul, p.42). He believed that all nobility came from God, who had chosen their ancestors for their virtue and let them rule.

These arguments, though, never held up very well under the intense logical scrutiny they were given. Many theorists thought that it was ridiculous to try to make lineage mutually compatible with virtue. As Nigel Saul says, “virtue was an individual quality whereas birth was a hereditary attribute with which even those without virtue might be endowed”(p.42). Many clerical writers took this idea even further, believing that nobility of the body amounted to little more than a “sack of filth,” since lineage came about through an “unclean and shameful act of the parents”; therefore, the aristocracy’s nobility could really only be considered “carnal nobility”(Saul, p.42). The clerics believed that nobility had to be earned through a person’s actions, not just the deeds of their ancestors. Ironically, although not surprisingly, clerics considered themselves to be the “true nobility,” because they had exercised their minds, and mastered the art of reason. Therefore it was not the pleasure-loving aristocrats who were naturally virtuous, but the intellectual clerics. These ideas were not well received among the aristocrats and as Nigel Saul says they “prized the ‘true nobility’ hardly as much as an apple” (p.42).

Chaucer wrote on this subject and tried to reconcile the two ideals, but believed that nobility does not guarantee virtue. In his poem “Gentillesse” he sees gentility as a “personal, not hereditary quality...whose ultimate source was Christ” (Saul, p.43). His writings allowed an opening in the social fabric by which members of the bourgeoisie could be considered as gentle as aristocrats.

In the *General Prologue* of the *Canterbury Tales* Chaucer does attempt to merge the two ideals in the character of his “verray parfit gentil Knyght” (l. 72). The Knight is of aristocratic lineage but he also loves “chivalrie, trouthe and honour, fredom and courtesie” (GP line 73). Some scholars hold the Knight to be Chaucer’s way of showing that lineage can mean the upholding of virtue. The Knight has fought in many battles, primarily against “heathen countries,” in accordance with Pope Urban’s decree of 1067 that knights should only fight against enemies of the Church (Bowden, p.21). The Knight is also modest in both his dress and his bearing, leading many critics to believe that he represents Chaucer’s chivalric ideal. Many critics think that through the Knight he is showing that lineage can be consistent with virtue, but that it will not necessarily guarantee it. In Chaucer’s time, though, Chivalry was becoming a thing of the past, as the

changing economic situation as well as the brutality of the “chivalrous” knights in the later Crusades and the Hundred Years War led to its decline.

The changes in the depictions of class in Chaucer’s writings reflect the revolutionary changes that were affecting England in his life time. In this new economy surplus wealth was not consumed or hoarded but invested as capital in the hopes of realizing even more capital. This allowed for increased social mobility as land-based wealth was put into competition with trade-based wealth (Bisson, p.165). The commercial revolution would change every sector of English life as, in the words of Patterson, “ values, education, administration and exchange all underwent drastic transformation” (p. 167). Many critics feel that Chaucer is a distinctly bourgeois writer and that the *Canterbury Tales* is a bourgeois production (Patterson, pp.322-323). Chaucer does give a large space to “that middle range of society that could not be accommodated to either of the prevailing social models, neither the implicit binary division of society into ‘gentils’ and ‘churls’ nor the traditional ternary model prescribed by the estates theory”(Patterson, p. 323).

The majority of Chaucer’s pilgrims cannot easily be fitted into the estates theory and, moreover, many of them seem to have little use for the landed elite with their value system of *gentillesse*. Most of the pilgrims are defined by their occupations and find the traditional feudal ideas of community as well as the commitment to “common profit” to be totally out of place in their way of life. Instead, they are concerned solely with the exchange of commodities. Among these characters are the Guildsmen, the Wife of Bath and the Merchant. They all exemplify various aspects of bourgeois culture, in that they are concerned with commerce, they espouse individualism, and yet they are attempting to ape the aristocracy in their fine dress. None of them is considered gentle and only the Wife is willing to admit that fact to the world. In this way Chaucer avoids using wealth to define the essence of gentility, which was right in line with the thinking of his time period. The Knight is either not wealthy or very modest, particularly when compared to the ostentatious Wife of Bath and the well-dressed Merchant. While Chaucer does express many bourgeois ideals, it is hard to see him as really being bourgeois. He does not always find bourgeois activities to be ideal, and in *The Rime of Sir Thopas* and *the Shipman’s Tale* many critics feel he is critical of bourgeois characters obsessed with money and appearance. In addition, he is critical of bourgeois characters involved in unseemly activities like the Merchant’s possible usury and illegal monetary exchange. In other tales, though, he more clearly embraces the bourgeois definitions of gentility and identifies them with characters who can be seen as gentle despite their lineage, because they uphold virtue. *The Franklin’s Tale* and *Wife of Bath’s Tale* in particular are works in which he conveys bourgeois ideals.

The Wife of Bath, in her pilgrim portrait, Prologue, and Tale, is considered to be among Chaucer's more prominent characters to explore notions of class and gentility. Many critics have seen the pilgrim Wife of Bath not as a feminist, but as a quintessential representative of the new English bourgeoisie (Finke, pp.172-173). In the *General Prologue* she is said to be a cloth-maker, working in the industry that would lead England to its economic power in the world after having been a backwater for many years. Many critics have seen the wife as a true capitalist, the owner of a large wool workshop that was financed by her first three husbands' money (Finke, pp.175-176). Others just consider her to be a simple cloth maker who is particularly skilled at tailoring. In her prologue, the wife is extremely focused on exchange and commodities and often speaks in terms of profit/loss, particularly in relation to the institution of marriage. She says her first three husbands "had me yiven hir lond and hir tresoor" in exchange for her body. Each of the first three husbands does this and then dies, his purpose to the wife having been served (Finke, p.177). None of these marriages seem to have resulted in any children, leading some to believe that this represents the barrenness of her life, which is solely concerned with profit: "alle is for to selle"(Finke, p.171).

The Wife's tale itself is supposed to be about female dominance in the institution of marriage, but this theme is completely overshadowed by the question of what makes someone virtuous: lineage or actions. The Tale begins with a knight of good lineage and wealth, one whom de la Marche would consider to have "gentillesse." Yet this knight while returning from hunting commits an act of rape and is sentenced to death. He can save his life if he can answer one question that seems to have no definite answer. He finally meets an ugly old peasant woman who tells him the correct answer in exchange for his knightly vow to give her whatever she wants. He answers the question--what do women most want?--with the reply, sovereignty in marriage. His life is spared, but at the last moment the old peasant woman comes forth and demands he keep his chivalric vow and marry her. With no other choice before him, he retires to bed with his new wife. The, old woman, wondering why he fails to perform his husbandly duties, asks her husband what is wrong. He responds, "though art so loathly, so oold also, And thereto comen of so lough a kynde [lineage]"(WBT 1100-1101). The old woman then launches into a long speech about how *gentillesse* is the property of those who "lyven virtuously and weyve synne," not those "descended from old richesse""(WBT, 1176). She also tells him that "vileynes synful dedes maketh a churl," which reminds us of the rape for which he went largely unpunished. In this way the aristocratic conditions for virtue are thrown away, as Chaucer's middle class ones are ushered in. This is seen by some critics as the first real sign of the new capitalist class asserting what will come to be its cultural ideology in its early stages. In our time the ideas set forth in the wife's story are extremely clichéd (Finke, p.184), but Marx saw them as the beginning of the ruling ideology that made

bourgeois dominance legitimate (*Capital*, p.873). In the end of the tale the old woman turns herself into a beautiful young lady in exchange for dominance in the marriage. The knight, of course, no longer cares about her class position once she becomes beautiful as well as young, and they live happily ever after in what is a very unbelievable, yet Chaucerian ending.

Within this tale Chaucer expresses his ideal of what determines gentility: a person's deeds and not his lineage or material wealth. In fact, he reflects the middle class attitude toward the aristocracy of his time in the depiction of the knight who considers himself gentle but rapes maidens by the river. The aristocracy was seen in a bad light by the middle class because of both their influence in the government and their idleness. The idea of gentility does not concern the pilgrim Wife of Bath very much, but her arguments do reflect her bourgeois status, which she proclaims as much as if not more than any of the other characters within the *Canterbury Tales*. The redefinition of *gentillesse* was very important to the middle class, who wanted to believe that they could be as virtuous as any of the traditional feudal classes, despite their non-traditional occupations.

The *Franklin's Tale* is quite different from the *Wife of Bath's Tale*, reflecting the personality of the pilgrim who tells it. As Nigel Saul says, the Franklin is the one pilgrim whose position in the pecking order is open to question. The Franklin has an extensive record of office holding and service to his county: "At sessions ther was he lord and sire./ Ful often tyme he was Knyght of the shire"(General Prologue 355-356). Yet this would have been the exception, not the rule for one of his status, because the Franklin class was just coming into its own at the time of Chaucer's death. Thus, this passage is more of a statement of that groups' aspirations than of their actual accomplishments (Saul, p.46). He is also a very generous man who gives large banquets to locals in a true lordly manner. The Franklin himself appears to be doing all that he can to appear gentle, and yet that striving makes him look all the more bourgeois. Franklins were not of noble birth and many of them were sons of the wealthy bourgeoisie who had settled in the country with their inheritances. The real class origins of the Franklin in the *Canterbury Tales* is not known but can be inferred from complaints he makes about his son to the Squire, before he tells his tale: "And he hath levere talken with a page/ Than to commune with any gentil wight/ Where he myhgte lerne gentillesse aright" (Saul, p.47). The Franklin, according to Saul, is so "preoccupied with gentility because he does not see himself as possessing it on the grounds of rank or inherited wealth and sees his son squandering any chance of possessing it by manner of life"(Saul, p.47). The Franklin sees his son as the only chance for his lineage to gain fully the *gentillesse* that has eluded him despite his success.

The *Franklin's Tale* itself is a real reflection of his aristocratic ambitions, yet his middle class origins remain evident within it. The tale is the fourth one in the so-called marriage group and, as in the *Wife of Bath's Tale*, the marriage theme is overshadowed by the class questions within it. The tale is the story of a chivalric knight Arveragus who marries a woman named Dorigen. He goes off campaigning in England and his wife remains at home in Brittany. A squire Aurelius has in the meantime fallen in love with Dorigen. She rashly promises to become his lover (as a joke) if he can remove the large rocks on the Brittany coast that could be a threat to her husband's safe return. Aurelius contacts a magician who could possibly be of help in removing the rocks. The magician is the most bourgeois of all the characters in this tale; he is very concerned with the price and with the exact area from which he will make the rocks disappear. The magician demands a thousand pounds for his services, which Aurelius rashly promises to him, for removing the rocks "of Britayne/ And eek from Gerounde to the mouth of Sayne" (FT lines 1221-1222). The magician reflects the personality of a merchant more than the intellectual clerk he is supposed to be. The magician removes the rocks and Dorigen is forced to either break her oath or dishonor her husband. Instead of making the decision herself, she goes to her husband Arveragus and confesses what she has done. He advises that she keep her vow to the squire because he feels that "trouthe is the highest thing a man may kepe" (FT l. 1481). It is more important to Arveragus that his wife be faithful to a promise than uphold her outward honor (Saul, p.47). Dorigen goes to Aurelius and tells him her husband is forcing her to keep her oath, and in an act of true "gentillesse" he lets her go from the oath. Then he has to deal with the debt to the very commerce-minded magician. He vows that he will honor his chivalric oath and pay the debt in installments. He goes to the magician with only half of the money and tells him the entire long complicated story. The magician is sympathetic and in an act of true "gentillesse" he releases the squire from his debt to him. The knight and squire thus both act in a very gentle way, and, more surprisingly, so does the exchange-minded clerk. The question posed to the reader at the end is who is most generous--the knight, the squire, or the middle class magician who rises to aristocratic behavior. This tale is yet again a vehicle for Chaucer to convey his ideas that gentility is not a quality that is dependent on birth, but is acquired through actions and manners (Saul, p.47). This ending truly fits the Franklin, who shows that not only can those of aristocratic lineage be virtuous, but so can those of humbler origins. It is particularly important to a man who is lacking in high birth to believe he can still lead a virtuous life. It was probably important to Chaucer, himself of entirely middle class origins, that his own gentility be measured by something other than lineage (Saul, p.48).

The middle class of Chaucer's England was many things--productive, greedy, ambitious, and, at times, virtuous. In the attempts by medieval writers to define gentility



independent of lineage, we can truly understand the needs of this class for the legitimacy that Chaucer's works in particular would give them. In Chaucer's view the members of the new bourgeoisie were able to rise above old standards and assert their growing position in the tottering feudal society. These ideas would become the core of bourgeois ideology that still predominates in most Western nations to this day. In our time, and especially in America, we see that birth does not guarantee a thing about a person and that virtue is a quality that is totally independent of both wealth and birth. That Chaucer recognized this fact more than five hundred years ago in highly stratified medieval England shows how ahead of his time he truly was.

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# The Role of *ESS1* in Transcription Elongation

Anne Rossetini

## I. Introduction

Recombinant DNA technology would not be possible without the ability to manipulate some important microorganisms. Two organisms regularly used in the lab are *Escherichia coli* and *Saccharomyces cerevisiae*. *E. coli*'s gene regulation via promoters are well understood, and there are many high expression vectors available. *E. coli* is also easy to culture on a large scale and analyzed genetically. *E. coli* can be used as an expression system used to produce proteins such as hormones, antibiotics, and enzymes (1). Many early advances in genetic engineering came from *E. coli*. Some medicinal purposes of *E. coli* are the production of human insulin and human somatotrophin. The significance of using *E. coli* to produce proteins is that before the genetic engineering of these genes for these proteins, they were isolated from animals (eg sheep and cow). Proteins isolated from animals were problematic because animal diseases were being passed to humans. Also, many had allergic reactions to the animal products. The engineered proteins are, in a sense, pure. *E. coli* offers the greatest advantage of producing high levels of expression because there are many different constructs available with strong regulatable promoters that control both gene expression and copy number.

*E. coli* is widely used to study prokaryotic genetics, but for eukaryotic genetics, *E. coli* is not the optimal organism to study. Even though the overall biochemistry is similar, prokaryotes lack many functions common to eukaryotes, such as localization of ATP-generating systems to mitochondria, association of DNA with histones, and mitosis and meiosis (1). Because of this need for the genetic control of such functions to be assessed in a eukaryotic environment, *S. cerevisiae* has become very important. *Saccharomyces cerevisiae* is commonly known as brewer's and baker's yeast. It is easy to culture, glycosylates proteins, and, just as *E. coli* is being used for the production of human proteins, *S. cerevisiae* is already being used as an expression vector to produce human serum albumin, which is useful in plasma replacement therapy, and hepatitis B surface antigens for vaccinations (1). Eukaryotic DNA sequence analysis has been facilitated by the ease with which eukaryotic DNA can be cloned into prokaryotes. These

sequences can be obtained in large amounts easily and altered by bacterial genetic techniques. To determine if these induced changes have any effect on the expression and function of the gene, the sequences must be taken out of the bacteria and reintroduced into a eukaryote, such as yeast.

The yeast genome, which is 12057 kb, contains 16 chromosomes with an estimated 6,000 genes. It was completely sequenced in 1996 by an international scientific effort. This was the first genetic blueprint of any organism to be sequenced that was so closely related to humans.

One of the genes in *S. cerevisiae*, *ESS1*, is an essential yeast gene. *ESS1* plays an important role in transcription elongation. It is a positive regulator of RNA polymerase II. Loss of function mutations in *ESS1* will cause mitotic arrest in yeast cells. The importance of *ESS1* is understood by the discovery of homologs in *Drosophila*, *dodo* (2), and humans, *Pin1* (3). The amino acid sequence between these homologs is very similar, *ESS1/Dodo* are 48% identical and *ESS1/Pin1* are 46% identical (Figure 1). To fully understand how *ESS1* works, it is helpful to first look at the bigger picture into which it plays a part, the cell cycle.

## **II. Results**

### Cell Cycle in Yeast

Asexual reproduction is one way a new individual can develop from a single cell. Yeast are single-celled eukaryotes and will reproduce in this fashion by replicating their genetic material and then dividing, creating two genetically identical cells. The cell cycle is divided into two phases: mitotic phase and interphase. There are three stages that make up interphase: presynthesis or gap 1 (G1), synthesis (S), and postsynthesis or gap 2 (G2). In G1, the cells are preparing for DNA replication, which will occur in S. A major checkpoint in G1 that determines whether the cell is able to continue into S is known as the START phase in yeasts. The cells will remain in G1 until they have grown to a large enough size and the environment is favorable. The cells then go through S, DNA replication, on their way to G2. The G2 checkpoint occurs between G2 and mitosis (M). Unless the cell is big enough, the environmental conditions are favorable, and all the DNA has been replicated, the cell is unable to begin mitosis. A third checkpoint is during M. To proceed with chromatid separation, all the chromosomes must attach properly to the mitotic spindle (Figure 7).

Cyclins and enzymes known as cyclin-dependent kinases (Cdks) are key components that are involved in the regulatory events that occur at each checkpoint. In yeast, a single molecule of Cdk, CDC28, will function at both the G1 and G2 checkpoints (4). Cells defective for CDC28 are incapable of activating the complexes to initiate DNA

replication. At START, the CDC28 kinase is activated by G1 cyclins binding to it. The Cdk phosphorylates key proteins that are necessary to continue onto S. Once the CDC28 is activated, the cyclin levels are reduced as a result of proteolysis. A similar process occurs at the G2 checkpoint. The cell's exit from mitosis, at the M checkpoint, depends on the activation of the anaphase-promoting complex (APC). The activity of the APC depends on its interaction with the Hct1 protein. Active CDC28 will inhibit the transition into G1 by phosphorylating Hct1. The Hct1-dependent APC activity is necessary in budding yeast for the degradation of the mitotic cyclins. This degradation causes a sudden drop in the protein kinase activity of CDC28, allowing the cells to exit mitosis. This acts as a positive feedback loop. Once Hct1 is de-phosphorylated, the APC is activated, reducing the activity of CDC28, driving the cell into G1 (5).

Both haploid and diploid yeast cells can exit. The haploid cells are a result of budding and the diploid cells are a result of mating (sexual reproduction). Two mating types occur in the life cycle of *Saccharomyces cerevisiae*, a and a (Figure 2). Parental cells will reproduce mitotically by budding, giving rise to new haploid cells. A haploid cell from each mating type will fuse together forming a diploid cell. Diploid cells containing both a and a cells sporulate (go through meiosis) to produce an ascus. It contains four haploid meiotic products (each called an ascospore) of a diploid cell. Within this ascus are two ascospores of each mating type a and a. The ascospores are released when the ascus is ripe and they germinate to produce haploid cells. A diploid zygote forms from the fusion of an a ascospore and an a ascospore. It then undergoes meiosis to form an ascus, starting the cycle all over again (4).

### Transcription in cell cycle

There are many important proteins involved in the cell cycle, such as the APC and Hct1. These proteins are made by transcribing the DNA of a target gene and then translating it. If any essential proteins are missing, the cell will arrest. Transcription is the transfer of information from a double-stranded DNA molecule to a single-stranded RNA molecule. Transcription consists of four steps: preinitiation, initiation, elongation, and termination. Regulation of transcription can occur at each one of these steps and each step can be rate limiting. In preinitiation, RNA Polymerase II (RNA pol II) is recruited to the promoter and assembled into the preinitiation complex. Initiation starts when this complex catalyzes the synthesis and release of short RNA transcripts after release from the promoter. It takes on an elongation-competent form at the start of the third step, elongation. The fourth step is the release of the full length transcript and the dissociation of the polymerase from the template DNA. This results in the termination of transcription.

The transition from initiation to elongation involves a breaking of the ties to the promoter and other initiation factors (6). The transition of RNA pol II into the elongation stage involves the phosphorylation of the carboxy-terminal domain (CTD) of the polymerase (7). When the elongation phase ends, the polymerase releases the transcript and dissociates from the DNA template. The general rate of transcription elongation in yeast is greater than  $20 \text{ nt sec}^{-1}$  (8).

There are basic features of transcription elongation that are conserved among all DNA- dependent polymerases. These include the requirements of a promoter region, a region of DNA template that is single-stranded, and an RNA polymerase (9). For the elongation complex to complete RNA synthesis, the DNA template is melted within the polymerase, also known as the transcription bubble. Within this region is the catalytic site of the polymerase. At either end of the bubble the DNA is being unwound and then reannealed (Figure 3). All of these events are passive, requiring no energy expenditure, resulting from the structural aspects of RNA pol II (9).

Transcription elongation is a dynamic process that does not occur at a constant rate (10). Throughout the elongation stage, RNA polymerase may encounter elongation blocks of three kinds; pauses, arrests, and termination. Transcription pauses are when the RNA synthesis stops for a finite period of time before resuming. Transcription arrests are when the polymerase is unable to efficiently resume transcript synthesis without the use of accessory factors. Transcript termination is when the polymerase stops synthesis and cannot continue. RNA pol II can convert from the paused complex to the arrested state in a time dependent manner (11). This formation to the arrested state is kinetically determined; a competitive process determining whether to stay paused or stop completely. The eukaryotic protein TFIIS has been shown to allow complexes to resume elongation after arresting, illustrating its importance in elongation (12).

RNA polymerase II contains multiple subunits. Mutations in the large subunit of RNA pol II in *Saccharomyces cerevisiae* are suppressed by the overproduction of the TFIIS protein (13). TFIIS is a eukaryotic elongation stimulating factor. Disruptions of the gene encoding this protein renders *Saccharomyces cerevisiae* hypersensitive to 6 azauricil, a drug that interferes with nucleotide biosynthesis and reduces endogenous pools of GTP and UTP (14). At lower nucleotide concentrations, polymerases stall and arrest more often during elongation. If the same thing happens when GTP is reduced, it shows the cells have a need for a read through stimulus factor like TFIIS to synthesize transcripts effectively for survival (14).

## RNA Polymerase II

RNA polymerase is the enzyme that catalyzes the transcription elongation process. Its multiple subunits provide targets for the myriad of elongation controls.

Modifications to some of these subunits might directly alter the elongation properties of RNA polymerase. Phosphorylation of the largest subunit of RNA pol II was shown to directly affect the elongation reaction of the enzyme (7). This particular subunit contains a unique but highly conserved structure at the carboxyl terminus. The CTD consists of a heptapeptide Tyr-Ser-Pro-Thr-Ser-Pro-Ser repeated numerous times, 26-27 times in yeast (15). This peptide sequence is essential for survival and is highly phosphorylated at the Ser, Thr, and Tyr residues (7). Proline is a five-member ring that wraps back around onto the amino acid chain, disrupting normal conformation. This CTD is unique to RNA pol II and plays a very important role in transcription. A polymerase containing an unphosphorylated form of the subunit is preferentially recruited to the promoter. At the transition stage to elongation, however, the CTD becomes highly phosphorylated. This phosphorylation allows for a higher efficiency in carrying out elongation (9).

### *ESS1*

*ESS1* encodes a peptidyl prolyl isomerase (PPIase) that catalyzes the cis/trans conformation of the peptide bond preceding prolines. This protein contains an N-terminal WW domain, a C-terminal PPIase domain, and a short linker region joining the two domains (2).

The WW domain is about 40 amino acids long and is characterized by two invariantly positioned tryptophans. This domain folds into three tightly packed anti-parallel  $\beta$  strands that bind proline rich sequences (16). WW domains are found in many proteins of various functions. They mediate interactions between proteins (17). The WW domain of *Ess1* recognizes phosphorylated serines or threonines that precede proline (17). This phosphorylation increases the rate of isomerization by a 200-1000 fold. The PPIase domain catalyzes the enzymatic reaction of the isomerization of a peptide linkage. This domain's structure consists of four strands of anti-parallel  $\beta$  sheets flanked on either side by a helices (19).

Until recently, there were only two families of PPIases, the cyclophilins and the FK506-binding proteins (FKBPs). There are eight cyclophilins and four FKBPs that bind to cyclosporin A, FK506, and rapamycin to mediate their immunosuppressive and toxic effects, but the physiological functions of these proteins are largely unknown (20). These two families are identified as cellular targets of immunosuppressive drugs (21). Viable yeast mutant cells lacking all 12 immunophilins show that neither the cyclophilins nor the FKBPs are essential for growth (21). *Ess1* belongs to the recently found parvulin family of PPIases. The parvulins are distinct in structure and function from the other two PPIase families. Parvulins are not inhibited by immunosuppressive drugs and they do not bind to either cyclosporin A or FK506 (22). *Ess1* is the only parvulin in yeast. It is not inhibited

by the immunosuppressive drugs and there is no protein sequence homology to either the cyclophilins or the FKBP.

*ESS1* was originally proposed as a mitotic regulator for several reasons. Mitotic phenotypes were displayed by *ess1* mutant cells (23). Loss of function mutations caused the cell to arrest in mitosis, noted by the accumulation of large budded cells. Further study revealed fragmented nuclear DNA in these arrested cells.

To identify proteins involved in the *ESS1* pathway, there was a pursuit for yeast genes that, when present on multi-copy plasmids, would suppress the lethal phenotype of *ess1<sup>ts</sup>* mutants at 37°C. Six genes were identified; FCP1, YMR263W, YKL005C, CTH1, CPR1, CaRPB7. The latter four suppressed the complete deletion of *ESS1*. The interesting thing about these genes is that they were not cell cycle regulators, but they were important proteins for RNA pol II transcription and its regulation (24).

There is an observed interaction between Ess1 and the CTD (23). Ess1 was shown to physically bind to the CTD using biochemical approaches such as affinity pull downs and far western analysis. Binding was specific to the phosphorylated CTD. This was primarily done through the WW domain of Ess1, which is sufficient enough for binding (18). Based on genetic experiments done by C. Wilcox and X. Wu (24), it was shown that Ess1 positively regulated RNA pol II. Since Ess1 interacts both genetically and physically with RNA pol II, it is possible that it controls mitosis by controlling the transcription of the genes required for cell cycle progression.

All of the multicopy suppressers isolated, save one, are components of a large complex called a transcriptosome. This and the fact that Ess1 interacts with RNA pol II leads to the model represented by Wu et al (2000) (Figure 4). In this model, Ess1 catalytically isomerizes the CTD of RNA pol II acting as a regulatory switch by altering its structure. This will promote the binding or dissociation of CTD-binding proteins that function in transcription. The Ess1/CTD interaction phosphorylates the serines in the heptad repeat. This phosphorylation increases the affinity for the WW domain of Ess1 to the CTD.

### YKL005C

Although loss-of-function mutations of *ESS1* cause lethality, there are point mutations in *ESS1* that cause yeast cells to be temperature sensitive (24). These cells are able to grow at 21°C, but not at 37 °C (the normal permissive temperature of yeast). YKL005C was the most commonly isolated multi-copy suppresser of *ess1<sup>ts</sup>* (Figure 5). When YKL005C is overexpressed in *ess1<sup>ts</sup>*, the yeast cells are able to grow at the non permissive temperature (37 °C) (Figure 6) (24).

The mechanism by which YKL005C rescues *ess1<sup>ts</sup>* mutants is studied for several reasons. It is suggested that YKL005C compensates for most, if not all, of the mitotic

defects in *ess1<sup>ts</sup>* mutants because it is the best suppresser. YKL005C is dispensable for cell viability, making genetic approaches easy, and it is likely a bypass suppresser, meaning there is less functional overlap between the *ESS1* and YKL005C pathways and therefore, fewer genes commonly regulated by both pathways (26).

The function of YKL005C is not yet known, but there are two non-overlapping motifs within the protein that share similarities with other proteins of known functions, a PHD finger and a TFIIS-like motif. The PHD finger is located at the N-terminus (amino acids 216-402) and the TFIIS-like region is located at the C-terminus (amino acids 531-1062). PHD fingers are cystine-rich motifs found in many proteins that are involved in chromatin remodeling (25). The TFIIS-like region, which covers about one-third of the gene, is an important transcription elongation factor (9). To understand the mechanism by which YKL005C suppresses *ess1<sup>ts</sup>* mutations, it is important to find out which motifs are required for suppression. In finding this out, constructs expressing deletion mutations of YKL005C should be made and tested for suppression. In order to monitor the levels of proteins being produced, the protein needed to be HA epitope tagged, so that when treated with antibodies, the protein would be visible on a western blot. One such mutation was completed. It contained YKL005C with a truncated C-terminus. This mutation was unable to suppress *ess1<sup>ts</sup>* mutants indicating that the PHD finger alone is not sufficient for suppression (25).

### **III. Conclusion**

Two lines of evidence support the hypothesis that *Ess1* regulates transcription elongation. The first is that *Ess1* interacts genetically and/or physically with the CTD of RNA Pol II, which is important in every step of the transcription cycle including elongation (24). The second line of evidence came with the isolation of YKL005C and its sequence similarity to the elongation factor TFIIS. As a suppresser of the *ess1<sup>ts</sup>* mutants, it also suggests that *Ess1* regulates the elongation process.

Where do we go from here? *S. cerevisiae* is used in genetic research because it has many homologies to human genes and it is easy to manipulate. The study of *ESS1* has the potential for a two fold purpose. By understanding the mechanism for transcription regulation, it is possible to begin to understand how to either stop a cell from multiplying or trigger it to constantly divide. This first applies to cancer cells. A tumor or tissue mass occurs when a cell reproduces without constraints. The cell loses its ability to stop replicating. Any number of mutations could be responsible for creating a cancer gene. By understanding the mechanisms for transcription, which is necessary for cell growth, it may be possible in the future to induce cell arrest. The second application is to combating yeast that cause diseases in humans (eg *Candida albicans*). Knowing the



mechanisms for *ESS1* and its mutant suppressors could lead to the engineering of certain drugs that could stop the growth of the harmful yeast.

#### **IV. Acknowledgments**

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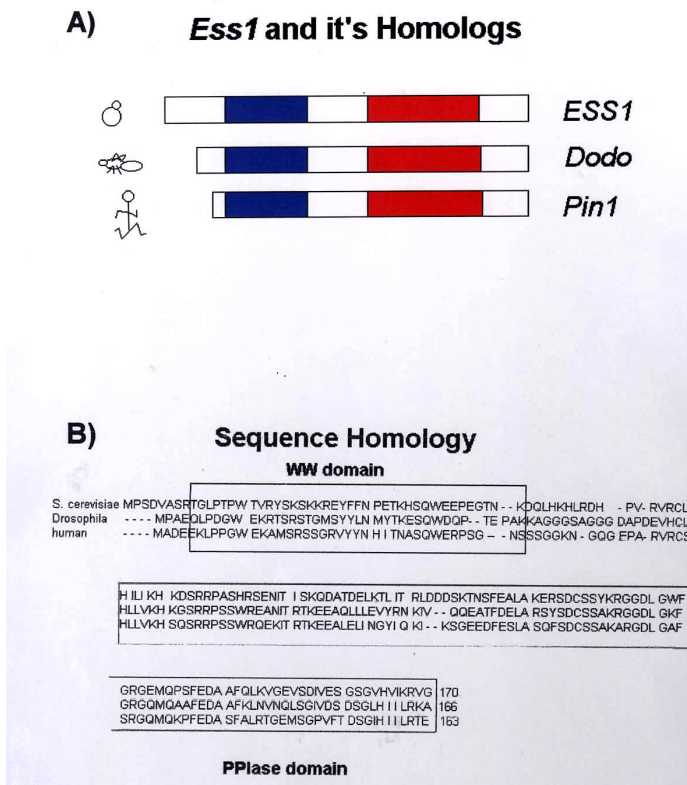
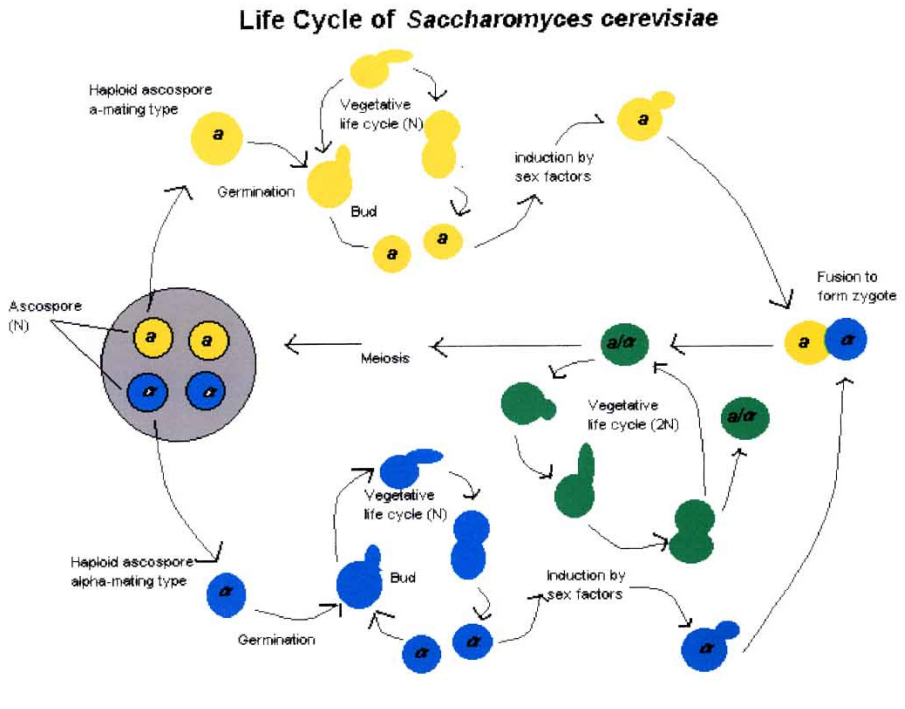
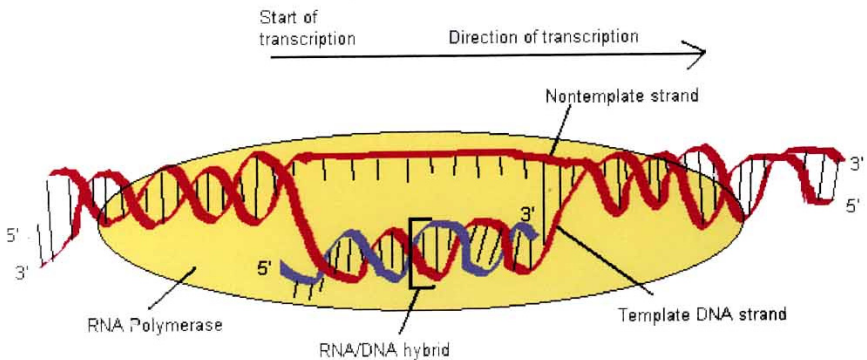


Figure 1: A) Homology of *ESS1* to *Drosophila* and humans B) Amino acid sequence of the conserved gene. The two boxed areas are the WW domain and the PPIase domain (21).



**Figure 2:** *S. cerevisiae* life cycle — mitosis and meiosis (4) page 170.



**Figure 3:** Transcription elongation. The DNA double helix is denatured by the RNA pol. It then catalyzes the synthesis of the single-stranded RNA chain (4) pg. 381.

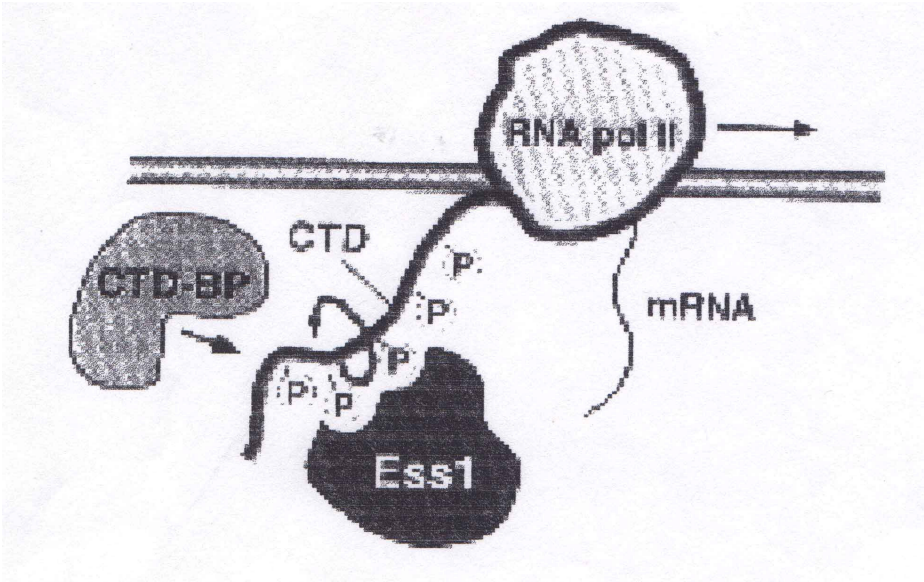


Figure 4: Ess1 binds and isomerizes the phosphorylated CTD of RNA pol II, acting as a regulatory switch. Changing the three-dimensional structure of the CTD alters the affinity of protein CTD interactions (21).

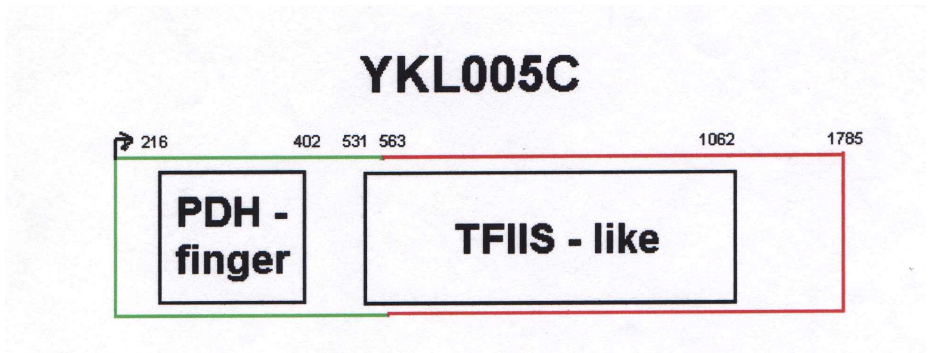


Figure 5: YKL005C and its domains. Green is N-terminus and red is the C-terminus.

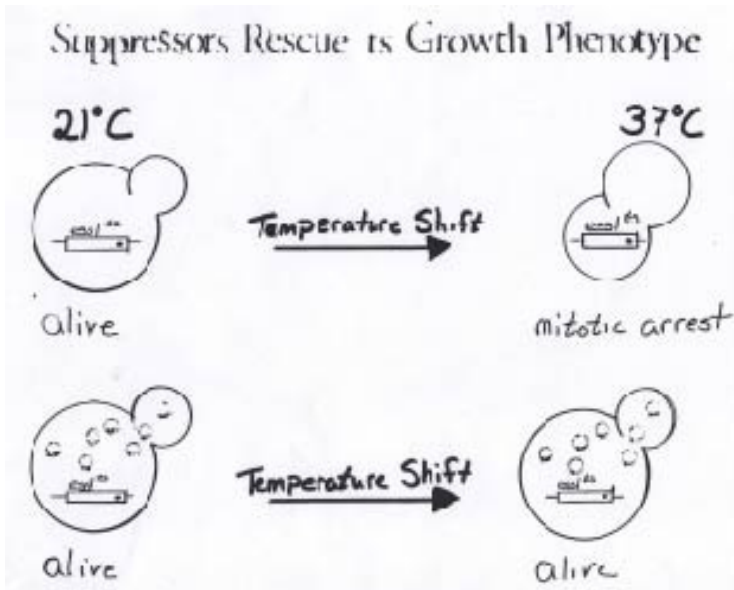


Figure 6: Overexpression of YKL005C (plasmid) will suppress mutant phenotype and allow the cells to grow at the nonpermissive temperature.

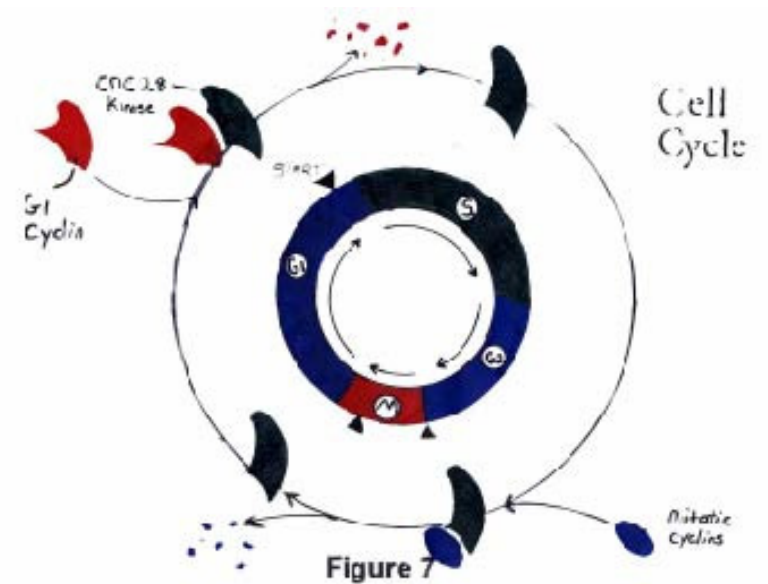


Figure 7: Simple model of the cell cycle.

## **From Vision to Reality: Development of a Utopia in *Parable of the Sower***

Emily Dillon

When the clock struck midnight on January 1, 2000, most people rang in the year just like any other. There were no violent riots or burning infernos or any kind of mass destruction that brought an end to life on this planet as it is known. Now, two years into the new millennium, most people's fears and anxiety about the coming of the apocalypse have subsided. But, what if "The End" was not really that far away? Octavia Butler's novel The Parable of the Sower, is set in the not-so-distant future (2024-2027) and warns of the harsh earthly reality that could be lurking right around the corner if mankind neglects to shape-up and improve treatment of the environment as well as treatment of each other. The most important point of the novel, though, was to show how the protagonist Lauren Olamina, a teenage African-American girl, rose from the rubble of the life that had crumbled around her and successfully planted the seeds of a new community; one based on trust, cooperation, and her own developing religion.

To find inspiration for the novel's setting, Butler had to look no farther than the closest newspaper. Drawing from the problems plaguing society today – global warming, drought, drugs, and gangs, to name a few – Butler wrote Parable of the Sower in what has been called the "if-this-goes-on category" (See 4). Placing only thirty years between the time she wrote the book and the years in which the story takes place, she created for readers "a shock of familiarity rather than estrangement" (Dubey 3). Lauren's hometown of Robledo, is small southern Californian community separated by walls from the horrors of a disintegrating society. "The world is in horrible shape right now," Lauren remarks in one of her diary entries (Butler 75). Only out of absolute necessity do people venture beyond the safety of the walls. Outside, people are starving and violent crimes are the norm. It is a time when clean water is a rare and expensive commodity, and those not shielded by partitioned cities are dying to break through and ravage those who are. "What does it mean when you're damned lucky to live in a cul-de-sac with a wall around it?" she wonders, "It's like an island surrounded by sharks ... our land sharks are on their way

in. It's just a matter of how long it takes them to get hungry enough" (Butler 73 and 44). The constant widening of the gap between the "haves" and "have-nots" leaves those not protected by walled communities clawing at the gates. Many people on the outside are "desperate or crazy or both. That's enough to make anyone dangerous" (Butler 9).

Lauren, though only fifteen at the beginning of the novel, is smart and mature enough to recognize the warning signs. She knew that her sheltered life in Robledo would not last forever, so she began to prepare herself for the inevitable. First, she read everything she could get her hands on. She wanted to learn how to live off the land because she feared that eventually those skills would be necessary. Second, she prepared "emergency kits," stocked with the essentials: a change of clothes, shoes, a blanket, food, matches, money, road maps, and most importantly, water, guns, and ammunition. In the event of an emergency, this grab-and-go pack would help ensure her survival for at least a few weeks until she could figure out what to do. Despite the logic behind Lauren's worries and preparation, no one wanted to listen; not her best friend, not even her father. They were in denial. Octavia butler sees this "lack of foresight" as one of the worst problems human beings have; "Educated people behave this way so they can keep their jobs. Uneducated people do it by doing drugs and taking too much alcohol" (See 3). The older people in Lauren's community kept dreaming of the past and they way things used to be, while the younger ones refused to admit that the situation could ever get worse. "I intend to survive" (Butler 51), Lauren said, and thanks to her realism and preparation, she was one of the few people who did.

During Lauren's research and reading, she began to develop her own ideas of religion and God, different from the ones by which her father, a Baptist minister, had raised her:

A lot of people seem to believe in a big-daddy-God or a big-cop-God or a big-king-God. They believe in a kind of super-person. A few believe God is another word for nature and nature turns out to mean just about anything they happen not to understand or feel in control of. Some say God is a spirit, a force, and ultimate reality. Ask seven different people what all that means and you'll get seven different answers. So what is God? Just another name for whatever makes you feel special and protected? (Butler 13)

Lauren's inquiries about her father's religion led her to begin something new. As more of a philosophy than a religion, Lauren started writing verses; reflections of what she saw around her. "I'm not interested in being fancy or even original," she said, "clarity and truth will be plenty" (Butler 111). One day while working in the garden, Lauren had an epiphany and finally realized what the name of her philosophy should be: Earthseed. She had been "thinking about the way plants seed themselves ... far away from their parent plants. They have no ability at all to travel great distances ... and yet they do ... they

don't have to just sit in one place and wait to be wiped out" (Butler 68). Later, after listening on the radio about new discoveries in space, Lauren realized that the destiny of her Earthseed religion was "to take root among the stars" (Butler 75). Planet Earth was going down the drain. Lauren's main goal was to see Earthseed taken to planets in other solar systems and used to found new lifestyles there. She knew this destiny could not be fulfilled for many years, but it was a realistic goal that would bring people together: "my heaven really exists, and you don't have to die to reach it" (Butler 199). She believed that the attainability of Earthseed's objective would draw people toward the religion. With one common aim for which to strive, they would unite to build the strong and harmonious communities they were currently lacking.

Lauren's opportunity to begin Earthseed came in July of 2027, sooner than she had ever wanted or expected. A gang of street poor known as "paints" broke down the gate of Robledo and caused Lauren's wall of safety to come crashing to the ground. Lauren's entire family was killed, along with most other residents of Robledo. She was alone on the outside for the first time in her life. The next day, she came across Zahra and Harry, two people who had also managed to escape from the chaos of Robledo's downfall. The three decided they would set out together and trek north toward Canada, in search of a better life.

Their journey was hardly a safe one. They were not the only group of people using the decrepit California highway system to flee from the south. They walked along the roads all day and crept off into the woods at night where they slept in shifts. There were many dangers on the road, but most of all, they had to be cautious of other people. They had to be ready to defend themselves at all times. Octavia Butler, herself, asserts that "anything living, if it feels threatened will try to push the other thing out of the way" (Mehaffy and Keating 59). She also states that "it delights people to find a reason to be able to kick other people" (*VISIONS*). Many of the scavengers who lined the highways were thieves and murderers just waiting for an opportunity to strike. They preyed on those who were weak, so in order to survive, you could never let the slightest sign of pain or problems show. This was a difficult task for Lauren who was tortured by a hyperempathy disease which, at times, left her nearly crippled at the sight of other people's physical distresses.

Despite Lauren's claim that "people stay alive...by being suspicious" (Butler 187), she became more trusting and willing to see the good in people. Throughout their journey northward, they slowly gathered more and more people and eventually the group of three became fourteen. As they all got to know one another, Lauren revealed all of the beliefs and ideas that were Earthseed. Through many lengthy discussions and debates, Earthseed's concepts became acceptable to the entire group. When they reached a plot of



land in northern California, owned by one of the group members, they decided to settle and found the first Earthseed community.

Through her steadfast belief in Earthseed, Lauren drew others to the religion and gradually, she became “the sower of new seeds” (Andreolle 5). She showed her new friends how to rise above the madness in which they used to live, and work together toward the common hope of a brighter tomorrow. Michael Oleska asserts that “the seed always needs soil in which to grow – the gospel always needs a culture in which to be planted” (Oleska 6). Once they were beyond the confines and chaos of southern California, their new beliefs could flourish. “No one plants without expecting a harvest,” Oleska states. Although it will take years to achieve the Destiny, Lauren founded Acorn, the first Earthseed community, as the piloting step toward correcting the damage that planet Earth’s endless turmoil had caused.

The people of Lauren’s group ranged in age from three years old to fifty-seven, and consisted of several races from black, white, Hispanic, and Japanese, to many combinations of the four. They all brought a different flavor. Madhu Dubey asserts that “the sole purpose that unifies this group of diverse people is their shared resolve to move toward a better future” (Dubey 7). One Earthseed verse reads: “Embrace diversity. Unite—or be divided and robbed, ruled, killed by those who see you as prey. Embrace diversity or be destroyed” (Butler 76). Robert Hughes declares that “Utopia has ever existed. It is one of the enduring phantoms of the human mind... every time someone tries it, it fails” (Hughes 1). But Lauren’s Utopia was centered on the ideas of change and diversity; perhaps that is why it succeeded.

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## **Homophobia: An Irrational Prejudice**

Ed Pietrowski

Homophobia, in its most basic definition, is the fear of homosexuality and/or homosexuals. However, many other definitions of this prejudice include phrases such as "hatred toward" and "discriminate against." While the racial and sex prejudice barriers have been knocked down, the wall separating homosexuals and society still remains. Homophobia has become very widespread in today's society, and there are numerous theories attempting to explain why this fear is so prevalent.

In an age when making racist or sexist remarks is forbidden, and worthy of prosecution, many degrading comments are unconsciously made about homosexuals in our society. It is not uncommon to hear one being ridiculed and called a "fag," "queer," or "homo," simply because of their sexual preference. It is not uncommon for friends to jokingly call each other by those derogatory terms. These words are used everyday, and have taken their toll on the homosexual community. Often at times homosexuals cannot handle the constant ridicule, the constant torture they receive from society.

This ignorance and discrimination is the source of many problems, the worst being death, in our world today. A homosexual man or woman may not be hired for a job simply because of their sexual preference. There is currently no legislation protecting the rights of gays and lesbians in the United States. They do not have equal rights protecting their housing, jobs, and public accommodations. Also gay couples do not receive equal access to governmental benefits (<http://www.bidstrup.com/marriage.htm>).

Many homosexuals never come "out of the closet" because they fear the treatment they will receive from society. Thousands of gay men and lesbians live in constant fear from the ridicule, and thus end it by taking their own life. Beating and hazing homosexuals is prevalent all around our country. There have been several cases in which gay men were brutally beaten and killed. Homophobia is a major problem in our society, and seemingly, nothing is being done to stop this prejudice (<http://www.bidstrup.com/phobia.htm>).

First, I would like to present several common so-called "reasons" for the prejudice of homophobia. One explanation of this intolerance is that it is considered acceptable because homosexuality is wrongly believed to be unnatural. This is perhaps the most common example, but is inherently incorrect and unjust. In the animal kingdom, nearly every known species has some homosexual activity. It is common for young, pre-genital mammals to have homosexual experiences. Also if we look back on human history, we see that homosexuality was practiced by one of the greatest civilizations known, Ancient Greece. Homosexuality was not only condoned in their society, but it was often promoted. Stories describing the Greek island of Lesbos show relationships involving two females were common, and male-to-male relationships were documented in Plato's Symposium. In nearly every culture spanning the earth there is evidence that there is homosexual activity, and it is not frowned upon and discriminated against by society. To say that homosexuality is unnatural is an irrational and incorrect assumption, it is widespread in the animal kingdom, in history, and around the globe (<http://www.emc.maricopa.edu/diversity/glhra/mythfact.htm>).

Another reason "justifying" homophobia comes from religious viewpoints. Many Christians believe the bible condemns members of the same sex being involved sexually. Also, in many religions, man and woman must have sex for reproductive purposes. If sex is used for pleasure purposes, it is considered sinful activity. Since homosexual relations are not for reproduction, this activity is immoral. Some Christians feel homosexuality is a learned lifestyle, therefore god did not create it. Since god did not create it, it must be sinful and immoral activity (<http://www.reliqioustolerance.org/homfuel.htm>). These have been the most prominent religious arguments, and through their viewpoint and beliefs, they are correct. These "reasons" blatantly prove the close-mindedness and ignorance supported by many religions.

One more possible reason for homophobia is one's own fear of being a homosexual. This usually occurs in individuals who are not secure in their sexuality. If they are unsure about themselves, they may have homosexual tendencies. But since homosexuality is perceived as wrong in society, they do not want to be that. They fear being burnt at the stake simply because of their sexual preference (Kilmartin 226).

Often times, heterosexual men say they fear gay men hitting on them, but the fact is that most gay men would never consider being with a straight man. Why would they force themselves on an unwilling partner, when they can find a meaningful relationship with another homosexual man? This fear of rape is another irrational reason for homophobia. If a straight man is asked about homosexuality and homosexual men, frequently the response is "I do not have a problem with them, as long as they stay away from me." This shows the ignorance and arrogance of many straight men, because most gay men wouldn't even consider them as possible partners. This also

shows narcissism in males, thinking that forced sex with a straight man is preferred of consenting sex with another gay man (<http://www.emc.maricopa.edu/diversity/glhra/mythfact.htm>).

According to Erik Erikson and his epigenetic theory of identity, newborns develop a mutual trust with their mothers. This occurs because the newborn needs the mother to care for him/her, and the mother's intentions are to care for the baby. This initial trust with the mother helps the baby develop a trusting, loving relationship with her. She shows her child that the world he/she just entered is safe. The child's identity is based on the trust instilled by the maternal relationship. When the baby begins feeling comfortable with his/her surroundings, then he/she is ready to move on to the next stage of development (Erikson 96).

I am not so much concerned with the baby moving on in development, as I am interested in the trust he/she shares with the mother. The relationship a boy has with his mother is the basis of many psychological theories of homophobia. It is often said that a boy's first love is his mother, because she was the first to care for him, nurture him, and he feels her unconditional love for him. The boy develops this special relationship with his mother, based on the trust they have shared since his birth. She loves him, and he knows his mother's love is very precious and special. He has something special that makes him different from everyone else; his mother loves him.

The only problem is, this love cannot continue the way the boy intends it to, but because he shares this deep trust with her, he begins identifying with her, and forms his own identity on this strong trust. Then a crisis occurs, the boy realizes that his mother is not the same as him. He recognizes that she is a different sex, he has a penis and she doesn't. He must now disidentify and distrust his mother who he thought was a more loving and caring mother. At this point in his life, she has cared for him, soothed him, and loved him more than anyone else he knows. This deeply woven, sincere, unconditional trust and love he shared with his mother has been destroyed, as well as his sense of identity. He will never fully recover from this tragedy. The young boy put his unconditional love out for his mother to grasp and cherish, only to find it was destroyed, and he is forever hurt. The boy was crushed, and he will never hold his love out again, simply because he was hurt by the one person who was never supposed to hurt him, the one and only person he loved.

Now, since he knows that he is different from his mother, and was betrayed by her, the boy turns to the only other person in his life, his father, and begins identifying with him. I feel the boy only knows that his mother is different. He is too traumatized to realize that he is the same sex as his father. Meaning he doesn't recognize his father as a male and having a penis. The boy then begins thinking that he is the only one with a penis, therefore different from everyone else. He then has the feelings of pride because he

has something, a penis, that no one else (that he knows of) has. This special feeling arises in the boy once again.

As the boy begins making friends who are like the one person he identifies with, his father, he thinks of them as being the same as his father, only younger and they like to play and have fun. He doesn't see them as threatening because they are just like his father, and he has something they don't have. He has the penis and that makes him special, they are like his father so they don't have a "penis".

As the boy grows older, he begins learning that he isn't the only one with a penis, but this doesn't affect him psychologically. He still feels like he has something no one else has, that there is something special about him. He then grows up subconsciously thinking that the other men are merely like his friends, non-threatening because they don't have the special-ness that he has. Also they aren't threatening to him because they do not want what he has, they will not take away what he has that makes him special.

When the straight man comes across a gay man, he begins feeling threatened, because he thinks the gay man wants the one thing that makes him special, that the homosexual man wants his "penis." The straight man feels threatened because he knows the gay man is sexually attracted to other men, and since he is a man, the gay man may be attracted to him. And if the gay man is attracted to him, he will want what the heterosexual man has, meaning his "penis," and the homosexual man will take the one thing that makes the straight man who he is, the one thing that makes him special.

I feel this is the majority of the fuel for the homophobia fire. When combined with ignorance, it can easily be seen how homophobia becomes a widespread prejudice. It psychologically threatens the pride of the male individual, this is something no other intolerance has done. I believe this to be the reason for the prevalence of male homophobia in our present-day society.

Another hypothesis about homophobia explains the cause as coming from societal ambitions and expectations for males and ideas of manhood. From the time of birth, boys are socialized to be masculine. The definition of masculine in our society is very unclear, and usually based on what is "not feminine." This socialization and teaching persuades young boys to be rough, competitive, and even aggressive. Also, boys are never to do any action that could be perceived as "feminine." When the boy starts playing with toys, it is not uncommon to see him running around with a gun, pretending he is a cowboy shooting at Indians. If the boy is interested in athletics, he is signed up for peewee football, and taught to tackle and hurt his opponents. This behavior, competitive and aggressive, is seen as appropriate in today's society; men should grow up to be big, and strong, and not back down from any challenge thrown at them (Kilmartin 226).

Another favorable outcome of this masculine socialization is to hide emotions. Every attempt is made to ensure that boys are not crybabies or sissies; which is

unacceptable by today's standards. Boys are taught to hold in their emotions, not show them at all, or to simply not have these emotions altogether, which in the long run will supposedly make them stronger, better men.

This masculine socialization only adds to the problems of homophobia.

Men grew up being rough and tough, confident, and aggressive, and ignorance becomes a product of this socialization. Gay men are often stereotyped as being the opposite of what a "man" is supposed to be. The stereotypical gay man is often seen as having feminine features, and wearing his emotions on his sleeve. Gay men are perceived as typically lacking the rough, tough and aggressive attitude men are supposed to develop. Because gay men are males, and do not act the part of being a "real man," they are discriminated against and seemingly tortured by society. The ignorance I am talking about makes these men (who's sexual preference is not the "norm") seem as though they are women, or worse unnatural because of their sexuality.

Another theory explaining the causes of homophobia begins much in the same fashion as the previous ones, and combines some aspects of both. It starts with the boy's relationship with the mother, and the betrayal he feels when he discovers they are different. The boy is heartbroken by his mother, his first love, and the woman that was never supposed to hurt him. This heartbreak develops into a subconscious distrust, or even hatred for women. These powerful emotions of distrust and hate toward women affect the man for the rest of his life, and may be a cause of homophobia. Because gay men have stereotypically feminine characteristics, and are sexually attracted to other men, a straight man may think of him as a woman (Kilmartin 226). This stereotypical view combined with the distrust and hatred toward women, makes straight men feel the same way about gay men as they do about women, that they have a strong, deep, hate for them, which can all be traced back to the relationship with the mother.

One final theory also begins with the boy's relationship with his mother. Stemming out of the trust between them, the boy develops a love for his mother. He sees himself as choosing his mother in the relationship. As the boy grows older and enters puberty, he begins to realize that in relationships women choose men. Thus he is not the "chooser," but the "chosen." A simple example of this idea is men portraying themselves to be the best-suited man for the female that they desire. The female then chooses the male that she feels is best for her. Thus women are the choosers, and choose men, simply because opposites attract. However, in homosexual relationships men remain the choosers, they mutually choose their male partners. This could explain why homosexual relationships typically do not last very long; there cannot be two choosers in a relationship, this contradicts that opposites attract. The hypothetical fact that gay men remain the choosers is a possible cause for homophobia. Heterosexual men may feel that a gay man will choose them, thus since a man chose them, they will be forced into the

woman's role in the relationship (Groth 6). This idea, combined with the man's subconscious distrust and hate for woman, which developed from his relationship with his mother, his socialization to be a "man" (to be tough, competitive, aggressive, and never show feminine features), and the expectations of society, cause him to fear, hate, and discriminate against homosexual behavior.

The above theories, and numerous more, could be the cause for homophobia in our society. In many cases, homophobic behavior could be a combination of many of these theories, although it could be caused by sheer ignorance as well. This irrational fear and hatred toward homosexuals and homosexuality may find its source in the first years of life, from the first relationship a newborn participates in, but somewhere down the road ignorance rears its ugly head. Just as with any prejudice, closed-mindedness and ignorance play an integral part in homophobia.

Around the world homophobia is being pushed aside, and homosexual marriages are becoming recognized. The nations of Germany, Denmark, and the Netherlands have legislation allowing same sex marriages. These pioneering nations have been open minded and accepting of their citizens' sexual preferences, now more nations of the world must become compliant with their citizens. Also, the states of Hawaii and Vermont have made gay marriages legal. Maybe this says something about the changing views and increasing acceptance of the American people, since nearly seventy-five percent of Americans are in favor of equal rights for homosexuals. Hopefully, more states and countries of the world will follow-suit and become tolerant of their citizens' choices (<http://www.bidstrup.com/marriage.htm>).

Similar to the racial, religious, and sexual prejudices, overcoming these intolerant behaviors and ideas will take infinite amounts of time and change. This prejudice will not be conquered in our society without an influx of liberating and accepting thought throughout our society. As a society, we can educate our citizens about the differences amongst all people. We can promote tolerance, acceptance and open minds. Until the appropriate actions are taken, homophobia will remain a major problem in our society.

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